



ANNUAL REPORT
OF THE
SURGEON GENERAL *of the*
PUBLIC HEALTH SERVICE
of the UNITED STATES

FOR THE FISCAL YEAR
1938



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LETTER OF TRANSMITTAL

TREASURY DEPARTMENT,
OFFICE OF THE SECRETARY,
Washington, January 7, 1939.

SIR: In accordance with United States Code, title 42, section 4, I have the honor to transmit herewith the report of the Surgeon General of the Public Health Service for the fiscal year 1938.

Respectfully,

H. MORGENTHAU, Jr.,
Secretary.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES.



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ANNUAL REPORT OF THE SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE

TREASURY DEPARTMENT,
UNITED STATES PUBLIC HEALTH SERVICE,
Washington, D. C., December 10, 1938.

SIR: In accordance with the act approved July 1, 1902 (U. S. C., title 42, ch. 4), I have the honor to submit for transmission to Congress this report of the transactions of the United States Public Health Service for the fiscal year ended June 30, 1938. This is the sixty-seventh annual report of this Service and the one hundred and fortieth year of its existence.

Probably the most important recent advances in the work of the Public Health Service are represented by activities founded on the broadening concept of public health. The outstanding recent developments are those resulting from the necessary assumption of increasing responsibility of the Government to society in matters of health, and the practical interpretation of these new ideals and new goals by recent acts of Congress, notably the Social Security Act, the Venereal Disease Control Act, and the National Cancer Institute Act. Through the provisions of these acts and appropriations made under the authorization thereof, undoubtedly a greater advance has been made in public health in the United States in the past 2 years than ever before within a comparable period.

While the older basic preventive measures dealing with quarantine and environmental sanitation were continued during the year, the modern salients of public health were advanced. The national movement to curb the venereal diseases was given a further impetus by the passage of the Venereal Disease Control Act (approved May 24, 1938). Many States and localities are intensifying their efforts against syphilis and gonorrhea, under the Federal assistance in developing their venereal disease control programs. This is in line with the general plan for improved and more nearly adequate State and local health services under the health provisions of the Social Security Act.

It has long been felt that the wider and more effective application of preventive measures already known would probably result in as great an improvement in health and saving of life as the discovery of a cure for one of the chronic diseases of the adult ages; and improved and modernized State and local health administrations, with properly qualified personnel, are being developed under the Social Security Act as one of the means of achieving this important advance.

Two outstanding events marked material progress during the year in the provision of facilities for research—the organization of the National Cancer Institute and the laying of the cornerstone of the first building of the new National Institute of Health at Bethesda, Md.

The ultimate purpose of research in the associated fields of public health is to produce practical results in either basic epidemiological knowledge or in methods of prevention and control that can be applied in our efforts to combat disease and improve the health of the people. Included among such studies during the year which resulted in contribution to our knowledge were rheumatic heart disease, Weil's disease, leprosy, Rocky Mountain spotted fever, trichinosis, the manner of excretion of ingested lead arsenate, neoarsphenamine, dental examination of large groups of school children, poison dusting by airplane in mosquito control, methods for preventing industrial mercurial poisoning, and many others which seem to offer productive fields for research.

In the following an attempt is made to summarize the principal activities of the Public Health Service during the fiscal year, which are presented more fully in the detailed reports of the administrative divisions.

COOPERATIVE PUBLIC HEALTH WORK

Active assistance was continued to the several States and Territories. A cordial relationship exists between the Public Health Service and the health authorities of the States, affording the opportunity to make important contributions to the public health through financial and technical aid, in improvement of local health services. A total of \$8,908,714.63 was allotted to the States as a part of the contribution of the Federal Government toward the establishment and maintenance of more adequate health services.

The expenditure for administration of the appropriation available under the provisions of Title VI of the Social Security Act, including the maintenance of special consultation services, was approximately \$120,000.

Cooperation of the States with the Public Health Service in the certification of water supplies used by interstate carriers was continued.

Assistance to the Pacific coast and Mountain States in the search for new foci of bubonic plague infection in rodents was extended, and the presence of the disease was discovered in a number of areas where it had not been recognized theretofore. This work is particularly important because of the possibility that the infection, if not kept under control, may, as has been the case in a few instances in the past, assume the "pneumonic form," in which it becomes highly communicable directly from person to person, and often spreads with great rapidity. In the course of the plague control work in Hawaii a new method of eradication of rodents by poisoning was developed, which gives promise of being the most effective means of destroying rats other than rat-proofing.

Cooperation was continued with the States and the Works Progress Administration in the technical supervision of work-relief labor projects for the construction of sanitary toilets, malaria control drainage in the South, and sealing abandoned coal mines. These projects are particularly suitable as a means of providing useful employment for relief labor, and permanent sanitary improvements have been obtained through this method of utilizing funds supplied for relief.

Shortly after the Social Security Act was passed, the President created, by Executive order, the Interdepartmental Committee for Coordination of Health and Welfare Activities of the Federal Government. The Public Health Service has participated actively in the work of this committee, which included, among the items on its program of action, the working out of interbureau agreements on plans for work with the States in public health nursing, industrial hygiene, nutrition, and assistance to the blind. This office also supplied three members of the Technical Committee on Medical Care, a subcommittee of the Interdepartmental Committee. This Technical Committee completed, during the year, a special study of health and medical care needs on a national basis, on which a report recommending a National Health Program was presented to the President on February 14, 1938.

INVESTIGATION OF PUBLIC HEALTH PROBLEMS

Progress in investigative matters was signaled by the organization of the National Cancer Institute in accordance with the act approved August 5, 1937, and by the laying of the cornerstone, on June 30, 1938, of the first building to be erected in the group of structures for the National Institute of Health on a tract of land near Bethesda, Md., donated for the purpose. The facilities to be provided will materially enlarge the physical means for attacking, on a broader front, many public health problems heretofore attacked within but a limited scope.

THE CONTROL OF BIOLOGIC PRODUCTS

Considerable attention was given to evolving a satisfactory method of evaluating antimeningococcic serum, and progress was made in developing a mouse-protection test for the purpose. It has been necessary to devote attention to gonococcus meningitis and to Pfeiffer bacillus meningitis, since a number of cases due to these micro-organisms have been reported. Antipneumococcic rabbit serum was commercially introduced during the year, and appropriate steps were taken for the standardization and control of the product. Investigation of the stability of the arsphenamines demonstrated the necessity of revising the regulations to govern certain features of production. At the close of the year, 61 establishments, of which 14 were foreign, held licenses to engage in the interstate sale of biologic products; the licenses covered 166 different preparations.

INDUSTRIAL HYGIENE

Investigations have been carried on in industrial hygiene with the object of developing means for the protection and improvement of the health of workers in varied fields of industry.

Dust studies have centered largely on the pottery, granite, and asbestos industries. In connection with studies of insecticide sprays recently begun, two volunteer members of the professional staff each ingested 100 milligrams of lead arsenate, in equal doses stepped over a 10-day period, under controlled conditions, for the purpose of ascertaining the physiological effects and affording knowledge regarding the elimination of lead arsenate in man. The greater part of both

the lead and the arsenic derived from the preparation was recovered; the lead was excreted principally in the feces and the arsenic in the urine. No untoward effect of ingesting this amount of lead arsenate was experienced by the volunteers.

Investigations of heavy metals comprised a medical study of some 800 workers in factories making lead storage batteries, the development of a new method for the determination of mercury in fur dust, and the finding of chronic manganese poisoning in a manganese ore-crushing mill. Studies of organic compounds affecting industrial employees related to chlorinated diphenyls, phenyldichloramine, the toxicity of ketones, and the toxicity of methyl bromide. Other studies related to fatigue, illumination, air contamination, sickness among industrial employees, and spectroscopic observations. Five outbreaks of dermatoses were studied, the causes determined, and suitable recommendations made for prevention.

CHEMICAL RESEARCH AND CHEMOTHERAPY

It was found that fluorides, which cause the endemic dental hypoplasia known as mottled enamel, can be removed from drinking water by treatment with magnesium oxide by a method which gives promise of economical development. In experiments bearing on nutritional diseases, it has been shown that light has a striking effect on the accumulation of ascorbic acid in the roots as well as the leaves of plants. Further researches were made on the two new adsorbents for invertase—a clay known as bentonite and zinc sulfide. Systematic studies of the preparation and properties of the higher sugars and their derivatives were continued.

INFECTIOUS DISEASES

Experiments on bioadsorption have offered a plausible explanation for the different effects of siliceous dusts on lung tissue. The rationale of various preventive measures or treatments of tuberculosis with ferric chloride, alumina powder or other so-called indifferent dusts, would appear to be a modification of the adsorbent system.

The known area of infection with Rocky Mountain spotted fever was enlarged during the year by the recognition of the disease in the States of Ohio and Massachusetts, as well as in a number of counties in various States already included in the known endemic territory. Cultivation of the rickettsiae of this disease proceeded satisfactorily, and immunization experiments were carried out in animals.

Study was directed to the cause of the increase in typhus fever during the last decade and to the development of methods for better control. A total of eleven species of native rodents has been found capable of harboring the virus of endemic typhus. The period during which the virus may be recovered from rodents is as long as five months.

The virus of lymphocytic choriomeningitis was cultivated in modified tissue culture through 27 passages without loss of virulence for mice.

The studies of active immunization against scarlet fever were expanded to include over 11,500 children. The attack rate among the treated children was found to be one-tenth that in a control group.

Weil's disease, heretofore considered a tropical malady, has been found to be endemic in the United States; clear-cut cases of the disease have been discovered in New York, Michigan, Pennsylvania, South Carolina, West Virginia, Iowa, Texas, and Florida. Information concerning the prevalence and methods of quick diagnosis was placed in the hands of physicians.

The wide prevalence of trichinosis marks this disease as one of unusual public health importance. Extensive investigations have demonstrated an incidence of 17 percent in the United States, a rate of one person infected in every six of our population. Prevalence is high along the North Atlantic and the southern Pacific coasts, low in the South, and intermediate elsewhere. Control necessitates State regulation of the garbage-feeding of swine.

According to information gathered during the year, leprosy has practically no tendency to spread in continental United States except in a few places along the Gulf coast and even there to a very limited extent. Attempts to cultivate the causative agent of both human and rat leprosy have, as heretofore, met with failure.

HEART DISEASE

The incidence of rheumatic heart disease among college students in the United States formed the basis of a study made during the year. Analysis of the data revealed a crude rate of 11.6 per thousand; by sex the rate was found to be 9.2 for men and 14.9 for women students. Incidence showed an inverse relationship to the size of the institution and the number of student health examinations. A corrected rate of about 6 per 1,000 was believed more accurate. It was pointed out also that an unwarranted diagnosis of heart disease may seriously affect a student's career both in college and in later years.

In one city intensively studied, rheumatic heart disease was exceeded as a cause of death only by tuberculosis, pneumonia, and syphilis among the infectious diseases. Among persons under 20 years of age, it caused more deaths than whooping cough, measles, meningococcus meningitis, diphtheria, scarlet fever, and poliomyelitis combined.

Clinical and laboratory studies have been conducted.

POLIOMYELITIS

A growing impression that poliomyelitis is becoming less of an infants' disease and more a disease of older children and adults has become so prevalent that an extensive inquiry was made as to death rate trends for the last 25 years. Comparing the more serious of the so-called diseases of childhood, it was found that for whooping cough and measles the spread between the rates for the younger and older age groups has increased slightly and that these two diseases continue, in their fatal attacks, to prefer the young as much as ever, though the total rates for all ages have declined. However, for meningitis, diphtheria, scarlet fever, and poliomyelitis this spread has definitely decreased, especially for the latter two diseases. It has been found, therefore, that fatal poliomyelitis has lessened its preference for the younger ages.

OTHER PROBLEMS OF DISEASE AND SANITATION

The viability of organisms holds an increasing interest. For example, of 119 naturally infected ticks collected in Texas in 1931, 16 were still living at the end of seven years, and virulent relapsing fever spirochetes were demonstrated in them at the end of 6½ years. The tularaemia organism has been kept at maximum virulence under laboratory conditions for 13 years.

A resurvey of the drinking water supply at Bauxite, Ark., 10 years after changing from a deep well source containing 13 parts per million of fluorides to a filtered river supply free from toxic amounts of fluorides, demonstrated a definite halt in the production of mottled enamel of teeth.

Surveys of an endemic area of selenium poisoning in southern South Dakota and northern Nebraska revealed the fact that, besides grain and vegetables, the chief sources of selenium for man are dairy products, eggs, and meats. Analyses of wheat and corn flour distributed by a local mill showed sufficient selenium to account for the urinary excretion of the element in some city dwellers under medical care. The fate of selenium in the body has been studied and progress was made in some of the biochemical aspects of the selenium problem.

The study of methods now in vogue and of new techniques applied to public health problems continued to receive attention. Investigations in this field featured the health of transients, statistics pertaining to prevalence and types of cancer, communicable diseases, child hygiene, environmental hygiene, milk in its relation to the public health, water supplies, and sewage disposal.

CANCER

Grants-in-aid totaling over \$90,000 were awarded for research purposes to 15 institutions and 14 trainees as cancer specialists and 9 research fellows were appointed. Steps were taken for the purchase of 10 grams of radium for loan to approved institutions for the treatment of cancer.

Research in progress at the close of the fiscal year comprised the influence of heredity upon spontaneous and induced lung tumors of mice, the role of extrachromosomal (nongenetic) factors in the causation of breast cancer, chemical carcinogenesis, the properties of malignant tissues and cancer cells, influence of diet on the growth rate of spontaneous breast cancer in mice, and the effects of bacterial filtrates and colchicine on tumors.

QUARANTINE AND IMMIGRATION ACTIVITIES

The quarantinable diseases continued to prevail in practically the same areas and to about the same degree as in the preceding year, with the exception of the occurrence of epidemics of cholera and smallpox in China and of typhus fever in Morocco. An increased prevalence of cholera in Indochina and of jungle yellow fever in South America was also noted.

The only cases of quarantinable disease to reach ports in the United States or its possessions during the year were two cases of smallpox, one

of which arrived at New York and the other at Honolulu. Isolation at quarantine prevented the development of secondary cases.

The epidemics of cholera and smallpox in China necessitated not only the taking, at West coast stations, of extra precautionary measures, including the conduct of intensive examinations to exclude cholera carriers but also the institution at Honolulu and San Francisco of a system of surveillance of aircraft passengers from Hong Kong similar to that enforced in the case of air travelers from South America.

Measures to prevent the introduction of yellow fever into the United States from South America were supplemented during the year by the completion of the immunization of aircraft-operating personnel, the organization of a mosquito-control unit at Miami, Fla., and the establishment of a reserve supply of yellow fever vaccine.

The successful operation of radio pratique at New York and Boston resulted in the extension of the system during the year to certain classes of vessels entering the harbors of Los Angeles and San Francisco.

The United States quarantine regulations were amended to provide that no living disease organism or vector shall be imported into the United States except under special permit issued by the Surgeon General.

During the year, quarantine officers of the Public Health Service inspected 15,873 vessels, carrying 789,591 passengers and 1,196,688 seamen, and fumigated 1,004 vessels. Examinations for plague infection were made of 5,399 of the 7,659 rats recovered following fumigation.

Inspections for quarantine and immigration purposes were made at United States airports of entry of 1,784 airplanes, carrying 23,172 passengers, of whom 6,730 were aliens.

Medical officers at the various United States ports of entry examined 2,447,339 alien passengers and 805,306 alien seamen. Certifications were made to the proper immigration officials, in accordance with the act of Congress approved February 5, 1917, of 20,372 passengers and 1,438 seamen as being afflicted with some mental or physical defect or disease.

A total of 65,261 applicants for immigration visas was examined by medical officers of the Public Health Service stationed at American consulates in foreign countries, 45,790 having been examined in the Eastern Hemisphere and 19,471 in the Western Hemisphere. Nine hundred and eighteen of those examined in the Eastern Hemisphere and 119 of those examined in the Western Hemisphere were reported by the medical officers to the American consuls as being afflicted with one or more of the defects or diseases requiring exclusion, and 8,438 of those examined in the Eastern Hemisphere and 2,538 of those examined in the Western Hemisphere were certified as being afflicted with a disease or condition which was likely to affect their ability to earn a living. Only one of the aliens who had been given a preliminary medical examination at American consulates in foreign countries and to whom a visa had been issued was certified upon arrival at a United States port as being afflicted with a condition requiring deportation.

HEALTH CONDITIONS IN 1937 AS INDICATED BY MORTALITY

WORLD HEALTH CONDITIONS

In the work of preventing the introduction of diseases from foreign countries and of controlling the spread of disease in the United States, it is important that the Public Health Service keep currently informed regarding the prevalence of communicable diseases in the United States and other countries throughout the world.

During the calendar year 1937 a total of 198,389 cases of cholera was reported to the Public Health Service as compared with 255,871 for 1936. A total of 101,201 cholera deaths was reported, of which India alone accounted for 86 percent of the total cases. One case of cholera, with one death, was reported in the Philippine Islands for 1937.

A total of 36,000 cases of plague with more than 22,000 deaths was reported for 1937, as compared with 33,000 cases and 20,000 deaths for 1936. Java and Madura did not report any plague cases, but reported 3,764 deaths, indicating a high incidence of unreported cases. The figures given for world-wide totals in this section must be considered as a bare minimum, as cases, and probably deaths, in some countries are very incompletely reported. While reports are compiled from all available sources, they must not be regarded as accurate or final with reference not only to the figures themselves but also with regard to the list of countries included.

Reports of 137,856 cases of smallpox with 28,280 deaths were recorded for 1937. The usual high incidence was recorded for India, with 104,974 cases and 26,447 deaths. A high incidence was also noted in the United States, Indochina, Nigeria, Belgian Congo, and Mexico, in the order named. The United States continues to occupy second place in smallpox prevalence among the nations of the world, according to incomplete data at hand.

A total of 314 cases of yellow fever with 290 deaths was reported in 1937. Of this number, 13 cases and 8 deaths were of the jungle type reported from Peru. The prevalence of this disease was confined to Africa and South America. Cases were reported in Brazil, Colombia, Paraguay, Peru, French Equatorial Africa, the Ivory Coast, Dahomey, Senegal, Sudan, the Gold Coast, and Nigeria.

All continents reported the prevalence of typhus fever, with a total of 30,326 cases and 1,753 deaths in 1937, as compared with 27,982 cases and 2,326 deaths in 1936. Reported distribution in 1937 was as follows: Africa, 12,014 cases; Europe, 10,444 cases; North and South America, 6,021 cases; Asia, 1,655 cases; and Australia, 118 cases.

HEALTH CONDITIONS IN THE UNITED STATES

General health conditions in the United States were favorable for 1937, as indicated by mortality rates based on preliminary data for 40 States, the District of Columbia, and Hawaii, representing about 85 percent of the total population of the country. In spite of a minor influenza epidemic during the first quarter of the year, the general death rate for this group of States for 1937 was 10.9 per 1,000 estimated population, as compared with 11.3 for 1936. While these rates

are preliminary and differ from the final rates computed by the Bureau of the Census, the provisional mortality rates of the Census also indicate a decrease of about 3 percent in 1937 as compared with 1936. These favorable health conditions continued into 1938, as preliminary figures for the first quarter of 1938 indicate a mortality rate 12 percent below that for the corresponding period of 1937, and the rate for the first half-year of 1938 was 10.8 per 1,000 population as compared with 11.8 for the corresponding period in 1937.

The provisional infant mortality rate computed by the Bureau of the Census for 1937 was 54.4 per 1,000 live births as compared with 57.1, the final rate for 1936, a decline of more than 8 percent.

The decline in maternal mortality continued through 1937, as evidenced by a provisional rate of 4.6 per 1,000 live births as compared with 5.3 for 1936, obtained through this special study of selected States. These rates give an index to the trend, although they differ from the final rates issued by the Bureau of the Census.

The uncertainty as to the future trend of tuberculosis mortality, which rose in 1936 with the cessation of the previous consistent downward trend, has been removed and the downward slope of the curve was definitely reestablished in 1937. A provisional mortality rate of 49.6 deaths from tuberculosis (all forms) for 1937, as compared with 51.7 from similar data for 1936, is encouraging. The final Census rate for 1936 was 55.6.

Neither cholera nor yellow fever appeared in the United States in 1937.

Two cases of human plague with one fatality were reported in the United States in 1937; one case occurred in Nevada and one case and the death occurred in California. Plague infection among rodents was found in California, Oregon, Washington, Montana, Utah, Idaho, Nevada, and Hawaii.

Poliomyelitis reached epidemic proportions in 1937, when an annual total of 9,511 cases was reported. The 1937 epidemic has been exceeded in the number of cases by only 4 years—1916 with 27,363, 1927 with 10,533, 1931 with 15,790, and 1935 with 10,839 cases. In 1937 there were 7 cases of poliomyelitis reported for every death registered.

A mild influenza epidemic occurred in the winter of 1936-37. The weekly incidence reached a total of 37,101 cases for the peak week ended January 30, 1937. A total of 446,239 cases was reported in 42 States for the calendar year 1937 while 39,198 deaths were reported for the entire country.

The United States continues to hold its unenviable position near the top among the nations reporting smallpox incidence. For 1937, 48 States reported a total of 11,673 cases of smallpox, as compared with 7,834 for 1936 and with 7,957 for 1935. The number of cases for 1937 is the highest since 1931, while the number of deaths (30) compares favorably with the average of 26 per year for the preceding 3 years.

Fortunately, the form of smallpox now prevailing in the United States is mostly of the mild, nonvirulent type which causes relatively few deaths. The presence of this unnecessary disease depends entirely upon how widely the efficacy of vaccination is recognized and the extent to which the preventive measure is applied.

A total of 2,393 cases of endemic, or flea-borne, typhus fever was reported in the United States for 1937, as compared with 1,732 cases for 1936.

The known area of prevalence of Rocky Mountain spotted fever has gradually been extended to include all geographic regions of the United States, the New England group being the last to recognize its occurrence when four cases were reported in Rhode Island in 1937. Final reports show 431 cases and 86 deaths for 1937 as compared with 362 cases and 88 deaths for 1936.

New low death rates were recorded during 1937 for typhoid fever, scarlet fever, diphtheria, tuberculosis, malaria, pellagra, nephritis, and diseases associated with pregnancy and childbirth.

The leading causes of death for 1937, according to preliminary data, were diseases of the heart, cancer and other malignant tumors, pneumonia (all forms), cerebral hemorrhage and softening, nephritis, accidents (except automobile), and tuberculosis, in the order named.

MARINE HOSPITALS AND RELIEF STATIONS

Hospital and outpatient care was furnished American merchant seamen and other beneficiaries at 154 ports; 566,931 accredited persons applied for treatment and other medical services, an increase of 211,121 over the preceding year. Likewise, there was an increase of 20,000 in the number of beneficiaries receiving dental treatment. The Coast Guard personnel, numbering 10,014, was served at the regular stations and 103 other places, and 13 medical and dental officers were assigned to Coast Guard ships and shore stations. By an act of Congress, dependent members of families of Coast Guard officers and enlisted men, retired list included, were granted the privilege of receiving in-patient treatment at marine hospitals. Merchant seamen constituted the largest class of beneficiaries treated and should continue to increase in number because of the two projects for training seamen inaugurated by the United States Maritime Commission. The numbers of patients from the Veterans' Administration and Works Progress Administration hospitalized during the year increased. After 63 years it was found necessary to change the method of admitting insane patients from the marine hospitals to St. Elizabeths Hospital because of the decision by the District Court of Appeals that these patients were being detained illegally. Admission in the future will be on a commitment basis.

Research was continued in pyretotherapy, focal infection, arthritis, and psoriasis. Vitamin D was proved to be of definite value in the treatment of psoriasis. The drug sulfanilamide proved to be a most important addition to the therapy of a number of diseases. Its use was greatly increased, and it was found to have a specific action in the treatment of infections caused by the hemolytic streptococcus, gonococcus, and meningococcus, as well as a beneficial effect upon infections due to various other organisms.

Construction of the new marine hospital at St. Louis, Mo., was begun on November 18, 1937. Plans for the new marine hospital at Boston were completed, and construction will begin at an early date.

The Public Health Service continued to supervise all medical relief activities in the Treasury Department and several other Government agencies in the District of Columbia.

VENEREAL DISEASE CONTROL

The most important event in the field of venereal disease control during the fiscal year 1938 was the enactment by Congress of legislation which provides financial assistance to the States, assures continuous coordinated efforts against syphilis and gonorrhea on a Nation-wide basis, and makes reasonable provision for research and investigations.

Investigations of important problems pertaining to the clinical management and public health control of syphilis and gonorrhea were conducted during the year in cooperation with a number of leading hospitals and research centers in the United States. State public health laboratories were afforded an opportunity to improve their respective serodiagnostic procedures through participating in an evaluation study conducted by the Public Health Service. Health authorities in a number of communities were assisted in conducting surveys to determine the extent of the venereal disease problem.

In order to comply with the many requests received from State health officers for consultation and advice on matters pertaining to the organization and expansion of their venereal disease control facilities, specially qualified commissioned medical officers were assigned as regional venereal disease control officers.

A field demonstration study was developed in southern Georgia for the purpose of ascertaining the most practical and most economical methods of providing treatment for persons in rural areas. The study of the effects of untreated syphilis in a group of male Negroes residing in Macon County, Ala., was continued during the year.

Participation of the Venereal Disease Research Laboratory in a number of important field studies made possible the correlation of clinical and experimental observations. Projected studies during the next fiscal year will necessitate an expansion of laboratory facilities.

The Venereal Disease medical center at Hot Springs, Ark., was instrumental in preventing the interstate spread of venereal diseases by providing treatment for 3,941 indigent persons from all sections of the country. The facilities of the center were also utilized for the training of health officers, private physicians, and medical social workers.

The many requests for talks, informative literature, and exhibit material received from community organizations and influential citizens throughout the country are indicative of the widespread public interest that now obtains in the venereal disease problem.

MENTAL HYGIENE

The work of the Public Health Service in relation to mental hygiene materially increased during the year, owing to the activities incident to taking over the completed buildings for the United States Public Health Service Hospital (Narcotic Farm), Fort Worth, Tex., and getting them equipped, furnished, and ready for reception of patients in October 1938. A medical officer in charge was assigned to the institution in April and a skeleton staff was appointed to handle the work.

The Public Health Service Hospital at Lexington, Ky., operated at approximately full capacity, with an average daily population of 949. Occupational therapy administered through means of the farm, shop, and various maintenance activities in the institution has been utilized to the greatest advantage in treatment. Minimum custody was granted to approximately 46 percent of the patients at some time during their residence, and during the fiscal year just ended no patients attempted to escape. Since the inauguration of a follow-up system for prisoner patients, definite information has been received that 347 former patients, representing 15.8 percent of the total number of patients discharged since the opening of the institution, had relapsed to the use of narcotics and that 72 others had been arrested for drug selling and other crimes, but had not relapsed to the use of narcotics. Of the combined total, 316 have been returned to this hospital for further treatment for drug addiction or as parole or conditional release violators. Many of the conditional release and parole violators returned have not relapsed to the use of narcotics and a number of the prisoner patients receiving new sentences and returned to the institution had not relapsed to the use of narcotics since their discharge from the institution. Admissions during the year totaled 950 patients, of which 590 were prisoners, 135 probationers, and 225 voluntary, while discharges for the year totaled 955.

Special studies regarding the nature and treatment of drug addiction have been continued at the Lexington hospital in cooperation with other agencies interested in various phases of this problem. Studies were also continued dealing with the abusive use of narcotic drugs and the determination of the medicinal and scientific requirements of the United States for such drugs.

The Public Health Service continued to supervise and furnish medical, psychiatric, and other technical and scientific services in the Federal penal and correctional institutions under the supervision of the Bureau of Prisons. In order that this service might be more closely integrated with the administration of Federal penal institutions, a medical officer of the Public Health Service was assigned to the Bureau of Prisons to serve as medical director of that bureau on a full-time basis. An additional medical unit was provided for the new Federal prison established at Terminal Island, San Pedro, Calif., during the year.

The psychiatric diagnostic service for the United States District Courts was continued during the year and expanded to include three additional courts. This service makes available to the Federal judges the benefit of a psychiatric opinion to assist them in determining the mental state of a defendant where it is considered an important element in the disposition of the case.

The special studies conducted in cooperation with the Mental Hospital Survey Committee were continued during the year. The object of these studies is to stimulate the interest of the several States in the adequate care of the mentally ill, to bring about greater equality and wider distribution of facilities therefor, to promote more uniform policies, and to improve the facilities for undergraduate and post-graduate instruction in psychiatry. Considerable progress has been made and much information has been disseminated through personal interviews and correspondence with those seeking advice on

hospital construction and hospital treatment, and also to those desiring information for the preparation of special articles on the problems of mental illness. Among the important achievements of the committee was a survey of the hospitals of Kentucky that pointed the way to the enactment of new administrative laws for that State designed to put the mental hospitals of the State on a sound basis.

Field studies in mental hygiene conducted in cooperation with the health authorities of Kentucky and the State University, dealing with mental disorders in relation to community make-up and function, have been continued throughout the year. The primary purpose of these studies is to investigate the basic nature and sources of factors involved in the production of mental disorders which arise in a typical American community. Another objective is to determine whether there is a pattern approach to this problem from the standpoint of the place which mental hygiene might occupy in a regularly constituted health organization.

COOPERATION WITH OTHER AGENCIES

In addition to the constant and intimate cooperative relationship with State and local health departments, discussed in a subsequent section of this report devoted to the Division of Domestic Quarantine (States relations), the Public Health Service cooperated with and extended its assistance to all departments of the Federal Government. This cooperation in matters that concern health reaches into almost as many diversified fields as the activities of Government. Some of the examples of this work of the Public Health Service are presented in the following:

During the year, in cooperation with the State Department, medical officers were detailed for duty at the American consulates in Europe, Canada, Cuba, and the Philippine Islands to examine applicants for immigration visas, and consultations were held regarding certain aspects of the international opium problem. For the Department of Labor, medical examinations and medical care were furnished aliens at ports of entry, health and safety standards in industry were promoted, and tabulations were made of industrial morbidity. The Department of Agriculture was given assistance in the enforcement of plant and animal quarantine, studies of the effect of ultraviolet light on spores of wheat fungi, effects of insecticides on the health of workers, and technical instruction in mosquito control. For the Department of Commerce, hospital data were analyzed and a special nomenclature of sickness and death was developed for use in special coding, and medical treatment was provided for men from various classes of vessels of the Department; blood and spinal fluid tests of specimens from the inmates of penal institutions of the Department of Justice were made, special physical examinations were made, and medical care was furnished in Federal prisons. For the Interior Department medical officers were detailed to the Philippine Islands to conduct medical examinations of Filipino laborers, a health survey was made of Puerto Rico, and aid was given in connection with the health of miners and workers in mineral industries. Hospital care and medical services were provided for the Coast Guard, and emergency relief was furnished employees of the Treasury Department.

Physical examinations were made of the employees in many of the Federal Departments and agencies, including the War and Navy, Civil Service Commission, United States Employees' Compensation Commission, and others. Advice, testimony, and laboratory investigations were provided for the Federal Trade Commission. Specialized assistance was rendered such agencies as the National Park Service and the Forest Service, whose activities are directly related to sanitation and other matters intimately concerned with the health of the general public.

On the other hand, it is with unqualified pleasure that acknowledgment is made of the reciprocal aid received from the various State and local health departments, and of the assistance received from various universities and hospitals in clinical studies. More than 75 hospitals throughout the country furnished autopsy material in the trichinosis studies, without which assistance the data necessary for the studies could hardly have been assembled.

Because of the question of adequacy of the health department of the District of Columbia, and as certain conditions and diseases were known to be prevailing to an abnormal extent in the District, the Public Health Service was asked, during the year, to make a comprehensive survey of the department and suggest remedial measures. With some 30 collaborators, including representatives from the Children's Bureau and the Bureau of the Census, such a survey was conducted and many suggestions were made, not only for improving the public health administration, but also for bettering the institutional care of the indigent sick. It was inevitable that many of the suggestions should entail considerable expense, but the proposals apparently fell upon receptive ears and already notable corrective measures are in prospect.

RECOMMENDATIONS

NATIONAL HEALTH PROGRAM

Investigations made by the Technical Committee on Medical Care of the President's Interdepartmental Committee on Coordination of Health and Welfare Activities have shown that despite the improvement of State and local health services in the Nation as a whole which has resulted from the application of grant-in-aid provisions of Titles V and VI of the Social Security Act, there are still large rural areas and many cities where adequate health service has not yet been provided. Only a few States have even fairly satisfactory programs for prevention of mortality from pneumonia and cancer; there are still serious deficiencies in the control of tuberculosis and malaria; very little is being done by most of the States in the field of mental hygiene, and there is room for a much larger expansion of industrial hygiene activities.

The investigations also have shown that approximately 40,000,000 people in the United States—the lower economic third of our population—are unable to provide themselves with medical care in serious illness, and that there is a deficiency of 360,000 hospital beds, including facilities for the care of mental patients and the tuberculous, in the country as a whole.

To aid the States in meeting these deficiencies it is urgently recommended that consideration be given to legislation which would provide for additional Federal appropriations for (a) expanding the present preventive public health program, with special emphasis on tuberculosis, syphilis, cancer, pneumonia, malaria, mental health and industrial hygiene; (b) medical care for persons otherwise unable to obtain such care; and (c) the construction of additional hospitals and health centers in localities where such facilities are needed.

RESEARCH NEEDS

Through the National Cancer Institute a practical start has been made in the development of more effective methods for the control of cancer. The amounts authorized under the act (\$700,000) are insufficient to bring the benefits of present knowledge to present cancer sufferers.

The virus diseases include, among others, yellow fever, influenza, and encephalitis. As a group they are of tremendous importance to the public health. The causes and methods of control show many virus diseases are poorly understood. New techniques for the study of viruses have been developed. It is important that the National Institute of Health establish a major section to deal with the virus problems.

The recent demonstrations of the value of sulfanilamide and related compounds in the treatment of many diseases brings freshly to mind the great possibilities of chemotherapy as a means of disease control. It is urgently recommended that funds be made available to establish in the National Institute of Health a unit for the study of chemotherapy.

VENEREAL DISEASE CONTROL

The Venereal Disease Control Act represents a sound plan for cooperation of the Public Health Service with State and local health agencies in the control of the venereal diseases, and for research to develop more effective and cheaper methods of control. It is recommended that funds be provided by the Congress on an increasing scale, as provided under the act, until an annual amount of \$25,000,000 is appropriated. Effective control of syphilis and gonococcus infection will not be attained until intensive and adequate measures are applied in every community of the country.

MENTAL HYGIENE

Because of the great economic and social importance of mental and nervous diseases, it is important for the Public Health Service to undertake more intensive investigations concerning their causes and prevention than is possible with the facilities now available. A neurological institute combining laboratory and clinical facilities for the study of the many and complicated phases of mental and nervous diseases is needed. Consideration should therefore be given to the establishment of such an institute.

HOSPITAL CONSTRUCTION

New marine hospitals should be erected in Florida and southern California because of the increasing number of beneficiaries applying for treatment in those localities. Two new tuberculosis hospitals should be erected, one near the Atlantic coast and one near the Pacific coast, because of the inadequacy of Fort Stanton and other marine hospitals for treating all types of tuberculosis. Funds should be made available to complete the proposed rehabilitation program at Carville, La., and at Fort Stanton, N. Mex. Recreational facilities should be provided at the Marine Hospital, Mobile, Ala., for convalescent and ambulant patients.

STREAM POLLUTION

It is recommended that legislation be passed which will provide an effective national policy for the prevention and abatement of stream pollution.

HEALTH EDUCATION

The increasing public interest in problems of health and medical care make it necessary for the Public Health Service to expand its educational facilities to meet the urgent demands of the public and of professional groups for health information. Such an educational program should embrace all approved educational media, especially the use of the documentary motion picture film as a means of teaching facts of health and disease.

Additional funds are needed for publishing the results of scientific investigations. The expansion of activities and augmentation of personnel has greatly increased the scientific output of the Service, but there has been no corresponding increase in funds for the prompt publication of results. Three Service circulars, The Health Officer, Hospital News, and Negro Health News, should be changed to printed periodicals. Budgetary allotments will be required for this purpose.

THOMAS PARRAN,
Surgeon General.

HON. HENRY MORGENTHAU, JR.,
Secretary of the Treasury.

DIVISION OF DOMESTIC QUARANTINE

(STATES RELATIONS)

Asst. Surg. Gen. C. E. WALLER in charge

THE PUBLIC HEALTH PROGRAM UNDER TITLE VI OF THE SOCIAL SECURITY ACT

Funds authorized under the Social Security Act (approved August 14, 1935) have been available for a little more than 2 years (since February 1, 1936), and a total of \$19,333,000 has been appropriated by the Congress to be distributed among the several States during this period of time. The progress which has been made throughout the Nation in the extension of public health facilities has been unequalled in any similar period during the history of the country, and the work has been developed along sounder lines than ever before.

In order that specific diseases and health problems might be attacked more effectively, State health authorities have recognized the necessity for effective basic health organizations through which specific preventive and control measures might be prosecuted.

Increases in State and local appropriations for public health purposes amounting to more than \$8,000,000 annually have been realized. The facilities available for providing whole-time health service to the people, especially in many rural areas where it had not existed previously, have been materially augmented. On January 1, 1935, only 594 counties were under the direction of whole-time health officers, whereas on December 31, 1937, there were 1,165 whole-time county or district health units, a net increase of 96.1 percent. When it is considered that the first whole-time county health unit was organized in the year 1911, the greatly accelerated rate of increase in such organizations within the past 3 years is striking. Eight States now offer whole-time county or district health services to their entire populations, while only six provided such services at the close of the fiscal year ended June 30, 1937, and only three at the close of the calendar year 1935.

The rapidity with which local health services have been organized in the Western States is especially noteworthy. The number of counties under whole-time health service (county or district) in those States as of June 30, 1938, was 134, as compared with 85 on July 1, 1937, an increase of 57.6 percent in 1 year. However, it should be noted that in spite of this increase fewer than one-third of the 412 counties in the western area are served by whole-time local health departments.

In addition to the local health facilities, State health organizations have been strengthened to a gratifying degree. Prior to the enactment of the Social Security program, in many of the States there was not only a scarcity of local health units or departments worthy of the name, but there were no directing forces in the State health

departments for the promotion and supervision of such local health services. Nineteen States have developed facilities for this purpose; 46 strengthened their public health engineering forces; 43 their public health laboratories; 33 their vital statistics divisions. Activities directed against the communicable diseases were augmented in 38 States, and every State increased and strengthened its public health nursing services. Full-time dental units now have been established in the health departments of 32 States.

For the fiscal year ended June 30, 1938, \$8,000,000 was appropriated for distribution to the States in accordance with the provisions of Title VI of the Social Security Act. The amount of \$1,116,655 remained unpaid to the States from the preceding fiscal year, making a total of \$9,116,655 available for allotment during the fiscal year under report. The allotments made to the several States for the fiscal year 1938 were as follows:

Alabama.....	\$289,941	Louisiana.....	\$192,039	Oklahoma.....	\$226,502
Alaska.....	37,716	Maine.....	73,470	Oregon.....	87,934
Arizona.....	62,408	Maryland.....	136,086	Pennsylvania.....	445,888
Arkansas.....	195,324	Massachusetts.....	236,471	Rhode Island.....	60,227
California.....	336,430	Michigan.....	292,732	South Carolina.....	208,776
Colorado.....	96,896	Minnesota.....	200,054	South Dakota.....	83,070
Connecticut.....	103,040	Mississippi.....	208,433	Tennessee.....	288,391
Delaware.....	33,608	Missouri.....	238,616	Texas.....	449,894
District of Columbia.....	67,545	Montana.....	44,600	Utah.....	67,173
Florida.....	128,317	Nebraska.....	65,000	Vermont.....	47,825
Georgia.....	304,150	Nevada.....	38,574	Virginia.....	232,174
Hawaii.....	64,784	New Hampshire.....	45,564	Washington.....	127,037
Idaho.....	71,756	New Jersey.....	205,467	West Virginia.....	160,929
Illinois.....	362,428	New Mexico.....	87,976	Wisconsin.....	185,647
Indiana.....	191,465	New York.....	671,620	Wyoming.....	28,998
Iowa.....	193,479	North Carolina.....	335,542		
Kansas.....	117,700	North Dakota.....	69,094	Total.....	9,116,655
Kentucky.....	248,501	Ohio.....	369,364		

The payments made to the several States from this fund for the fiscal year 1938 amount to \$8,908,714.63, as shown in table 1. Table 2 presents a classification of the principal purposes for which this fund, plus unused funds remaining in the several States, was budgeted.

TABLE 1.—Total payments made to the States under the provisions of Title VI of the Social Security Act for the fiscal year 1938

State	Total payment	State	Total payment
Alabama.....	\$289,941.00	Montana.....	\$44,590.00
Alaska.....	34,848.00	Nebraska.....	57,833.75
Arizona.....	62,408.00	Nevada.....	29,065.00
Arkansas.....	195,324.00	New Hampshire.....	45,564.00
California.....	316,836.00	New Jersey.....	205,467.00
Colorado.....	94,951.00	New Mexico.....	87,976.00
Connecticut.....	103,040.00	New York.....	661,120.00
Delaware.....	33,608.00	North Carolina.....	335,542.00
District of Columbia.....	67,545.00	North Dakota.....	63,133.25
Florida.....	128,317.00	Ohio.....	369,364.00
Georgia.....	303,400.00	Oklahoma.....	226,502.00
Hawaii.....	64,784.00	Oregon.....	87,934.00
Idaho.....	71,756.00	Pennsylvania.....	432,703.00
Illinois.....	346,088.00	Rhode Island.....	60,227.00
Indiana.....	169,840.00	South Carolina.....	208,776.00
Iowa.....	192,952.00	South Dakota.....	80,170.00
Kansas.....	104,620.00	Tennessee.....	288,391.00
Kentucky.....	248,501.00	Texas.....	413,763.42
Louisiana.....	189,446.71	Utah.....	67,173.00
Maine.....	71,166.00	Vermont.....	46,172.50
Maryland.....	136,086.00	Virginia.....	232,174.00
Massachusetts.....	236,471.00	Washington.....	126,637.00
Michigan.....	292,142.00	West Virginia.....	157,816.00
Minnesota.....	200,054.00	Wisconsin.....	184,197.00
Mississippi.....	208,433.00	Wyoming.....	23,639.00
Missouri.....	210,247.00		
		Total.....	8,908,714.63

TABLE 2.—*Purposes for which funds allotted under the provisions of Title VI of the Social Security Act were budgeted for the fiscal year 1938*

Purpose	Number of States	Amount		Percent
Local health services.....	45		\$4, 022, 735. 30	37. 66
Preventable disease control:			<i>Per cent</i>	
Venereal diseases.....	43	\$868, 105. 60	8. 13	
General.....	39	337, 831. 98	3. 16	
Tuberculosis.....	24	278, 790. 84	2. 61	
Malaria.....	10	134, 510. 86	1. 26	
Pneumonia.....	8	118, 695. 72	1. 11	
Trachoma.....	4	34, 863. 00	0. 33	
Cancer.....	5	30, 313. 72	0. 28	1, 803, 111. 72
Training.....	51		1, 583, 656. 93	14. 82
Sanitary engineering.....	47		563, 189. 65	5. 27
Promotion and supervision of local health services.....	36		542, 438. 45	5. 08
Laboratory.....	42		499, 919. 79	4. 68
Industrial hygiene.....	25		430, 906. 25	4. 03
General administration.....	49		415, 403. 73	3. 89
Vital statistics.....	35		212, 925. 67	1. 99
Public health nursing.....	24		157, 596. 25	1. 48
Health education.....	26		142, 343. 27	1. 33
Food and drugs.....	5		73, 185. 28	. 69
Oral hygiene.....	9		72, 115. 00	. 68
Rodent plague.....	5		69, 238. 00	. 65
Medical aid to transients.....	1		33, 017. 50	. 31
Maternal and child health.....	6		23, 619. 16	. 22
Survey of health conditions among transients.....	13		21, 669. 63	. 20
Mental hygiene.....	1		15, 380. 00	. 14
Total.....			1 10, 682, 451. 58	100. 00

¹ Including unused funds previously paid to the various States.

It is estimated that an additional expenditure of \$50,000,000 would be required to provide the minimum organizational needs alone of State and local health departments to serve all of the people. In spite of this deficiency, it is gratifying to note that important progress has been achieved through the use of existing facilities in an attack on specific diseases and health problems. The objects of this attack have been the venereal diseases, tuberculosis, pneumonia, cancer, malaria, typhus fever, hookworm disease, trachoma, psittacosis, and rodent plague in certain areas. It has been estimated that an expenditure of approximately \$150,000,000 annually would be necessary to provide effective measures against these specific conditions.

CONSULTATION SERVICE TO STATES

This division has been privileged to render cooperative assistance to the several States in the planning and organization of their facilities for the extension of public health work. The five regional offices which were established at the beginning of the program initiated under the Social Security Act, with headquarters at New York, Washington, Chicago, New Orleans, and San Francisco, have been able to render valuable assistance to the States within their respective districts. Each regional office has remained under the direction of a medical officer, who has associated with him a regional public health nursing consultant and a sanitary engineer.

The States comprising each of the five districts are shown in the following:

District No. 1, regional office at New York, N. Y.

Connecticut	New York
Maine	Pennsylvania
Massachusetts	Rhode Island
New Hampshire	Vermont
New Jersey	

District No. 2, regional office at Washington, D. C.

Delaware	North Carolina
District of Columbia	South Carolina
Florida	Virginia
Georgia	West Virginia
Maryland	

District No. 3, regional office at Chicago, Ill.

Illinois	Nebraska
Indiana	North Dakota
Iowa	Ohio
Michigan	South Dakota
Minnesota	Wisconsin

District No. 4, regional office at New Orleans, La.

Alabama	Mississippi
Arkansas	Missouri
Kansas	Oklahoma
Kentucky	Tennessee
Louisiana	Texas

District No. 5, regional office at San Francisco, Calif.

Alaska	Montana
Arizona	Nevada
California	New Mexico
Colorado	Oregon
Hawaii	Utah
Idaho	Washington
Wyoming	

Arrangements were made near the end of the fiscal year to add the services of a venereal disease control officer detailed to each of the five regional offices by the Venereal Disease Division, for the purpose of assisting the regional consultant with advisory services to the States in their venereal disease control programs.

In addition to the consultation services afforded through the regional offices, the Domestic Quarantine Division has continued to provide consultation services to States direct from headquarters in Washington, and has freely drawn upon other divisions of the Service for assistance in rendering aid of a technical nature to the several States. Consultation services were offered in the following fields:

(1) Public health engineering, (2) industrial hygiene, (3) public health nursing, (4) milk sanitation, (5) public health education, (6) malaria control, (7) nutrition, (8) dental hygiene, (9) laboratory methods, (10) pneumonia control, and (11) assistance to States in the evaluation of their health services through surveys.

INDUSTRIAL HYGIENE

Significant advances were made within the States in the field of industrial hygiene during the year. Twelve States are actively engaged in making surveys to determine the nature and scope of the industrial hygiene problem, and at the close of the calendar year 1938 studies will have been completed in 18 States. Twenty-seven States asked for and received consultation services on administrative and technical subjects. At present there are active industrial hygiene units in 26 States. Of a total of approximately 49 million gainful workers in the United States, 38 million are now in a position to receive some services in industrial hygiene. The total personnel in the 26 States engaged in furnishing industrial hygiene services is 163, of which 124 are professional workers. The entire budget for industrial hygiene activities in these States is now approximately \$600,000.

MALARIA CONTROL

Considerable time was devoted to giving instruction to epidemiologists, entomologists, engineers, and laboratory technicians in a 3-months school for State health department trainees. This school was conducted under the sponsorship of the Public Health Service in cooperation with the Rockefeller Foundation, the Bureau of Entomology and Plant Quarantine of the Department of Agriculture, and the Tennessee Valley Authority. Special instruction in the technique for the examination of blood films for malaria was given 165 technicians from five State health department laboratories.

Cooperation was extended to anti-mosquito (*aegypti*) campaigns in Miami, Fla., and Charleston, S. C., and to State health departments through surveys of their malaria control resources and field programs. Membership of the Public Health Service on the subcommittee on drainage and policy projects, National Resources Committee, was continued.

Technical supervision of the Works Progress Administration malaria control drainage program was continued.

NUTRITION

Visits were made to 11 States for the purpose of giving such advice and assistance as was indicated in matters of nutrition. Through collaboration with the nutrition specialists in the Children's Bureau of the Department of Labor, recommended minimum qualification standards for State health department nutritionists were drafted and presented to the Conference of State and Territorial Health Officers for approval.

The number of State health departments employing nutritionists increased to 19 during the fiscal year. The progress being made in these States indicates that there is a definite place in the State health department organization for a qualified nutritionist.

PUBLIC HEALTH NURSING ACTIVITIES

The consultation service on public health nursing was established as a regular function of the Domestic Quarantine Division in 1934. The general objectives of this service are as follows:

(1) To encourage State and local health authorities to improve the quality and extend the volume and scope of their public health nursing services through the attainment of best present day practices and standards.

(2) To encourage the development, within the several State health departments, of nursing leadership for all public health nursing within the respective States.

(3) To participate in a joint effort with other Federal and national nursing groups in the promotion of a unified approach to current public health nursing problems.

(4) To promote the establishment of sound educational facilities for the preparation of additional public health nurses to meet the increased demand for qualified personnel.

The personnel employed for this program consists of two public health nursing consultants, who are stationed at the Bureau headquarters in Washington, and five regional public health nursing consultants, one assigned to each of the Public Health Service district offices. The consultation service is rendered to the several States upon the request of the respective State health commissioners.

The functions of the nursing consultants are as follows:

(1) To advise State health administrators with regard to the organization and administration of nursing within a State health department. Before Social Security funds became available, 13 States provided no public health nursing advisory service. By January 1, 1937, all of the States, Hawaii, Alaska, and the District of Columbia had established services of this type. In more than half of the States public health nursing is now organized as a separate bureau or division of the State health department and is under the direction of a qualified public health nursing supervisor. Table 3 shows the type of organization in the several States and territories as of 1931, 1937, and 1938.

(2) To collect and analyze data on the number and distribution of public health nurses employed in the several States. This information was collected jointly by the nursing consultants of the Public Health Service and the Children's Bureau in cooperation with the several State health departments. The 1938 count of public health nurses shows an increase of approximately 10 percent in the total number employed by State and local health agencies over the 1937 count. The average population per nurse for the country as a whole decreased from 7,000 in 1937 to about 6,000 in 1938. The increase in the number of nurses employed by official (tax-supported) agencies was about 22 percent, while the increase in the number of nurses employed by nonofficial agencies during the same period was only about 3 percent. Table 4 gives the summary of the count of public health nurses for 1938 as compared with 1937 and 1931.

(3) To keep the Public Health Service informed with regard to the effectiveness of public health nursing programs which are financed

wholly or in part from funds allotted to the States by the Public Health Service. Approximately 150 consultation visits were made to local services during the fiscal year 1938. These visits were always made upon the request of the State health authorities and in most instances a representative of the State health department accompanied the nursing consultant to the local area.

(4) To assist the State public health nursing directors in planning staff education or "in-service training" programs for the public health nurses employed in the several States. A total of 133 visits was made to the respective States for this purpose.

One of the activities which has been received very favorably by a number of the States is assistance in the conduct of institutes for public health nurses. These institutes are planned and arranged by the respective State health departments in accordance with the outstanding needs of their workers. Assignments of special reading and reports are made well in advance of the scheduled institute and all persons attending the meeting are expected to participate. During the fiscal year 1938, the public health nursing consultants have assisted in the conduct of 51 institutes in 17 States. The distribution of institutes according to districts and the type of program is given in table 5.

(5) To assist the universities and colleges which offer courses of study in public health nursing by helping them to work out satisfactory facilities for rural field experience and by keeping them informed with regard to the public health nursing needs of the respective areas. A recommended plan for the organization of field experience centers was prepared and distributed to a number of the States. During the fiscal year 1938, the public health nursing consultants made a total of 57 visits to universities and colleges for the purpose of discussing public health nursing education. In addition, 17 consultation visits were made to rural field experience centers for the purpose of helping to improve this phase of the educational program.

(6) To assist in interpreting sound principles of public health nursing through participating in national, State, and local public health meetings. The public health nursing consultants participated in a total of 15 national or interstate meetings, 38 State meetings, and 47 local meetings during the fiscal year 1938.

TABLE 3.—*Type of public health nursing organization in State and Territorial health departments in 1931, 1937, and 1938*

Type of organization	1931 ¹	1937	1938
Separate bureau or division.....	9	21	26
Unit under central administration.....	2	7	6
Unit under local health work.....	3	5	5
Unit under division of maternal and child health.....	24	18	14
Total number of States and Territories providing a public health nursing consultant service.....	38	51	51

¹ Information secured from National Organization of Public Health Nursing study of nursing in State health departments, 1931.

TABLE 4.—*Full-time public health nurses employed by State and local agencies in the United States in 1931, 1937, and 1938*¹

	1931 ²	1937	1938
Total number of public health nurses.....	15,907	17,831	19,351
Approximate population per nurse.....	8,000	7,000	6,000
Total number of rural public health nurses ³	4,573	6,037	6,633
Approximate population per rural nurse.....	14,000	11,000	10,000
Total number of urban public health nurses.....	11,334	11,594	12,718
Approximate population per urban nurse.....	5,000	5,000	4,500
Total number of nurses employed by official agencies.....	9,682	11,840	13,388
Total number of nurses employed by nonofficial agencies.....	6,225	5,791	5,963

¹ Exclusive of Industrial Nurses and Nurses employed on W. P. A. projects.² Information obtained from National Organization of Public Health Nurses, census of Public Health Nursing, 1931.³ Rural includes the open country and all places having a population of less than 10,000.TABLE 5.—*Public health nursing institutes in which the nursing consultants of the Public Health Service participated during the fiscal year 1938*

District	Number of public health nursing institutes on—				Total
	Public health nursing supervision	Nursing aspects of syphilis control	Tuberculosis nursing	Health teaching	
Northeastern.....	1		4		5
South Atlantic.....	5	8		3	16
North Central.....			3		3
South Central.....	1	5	4	1	11
Western.....		10	3	3	16
Total.....	7	23	14	7	51

COOPERATION WITH STATES IN PREVENTING THE SPREAD OF EPIDEMIC DISEASES

PLAGUE-SUPPRESSIVE MEASURES IN WESTERN STATES

Field surveys to locate plague foci.—Seasonal activities to discover wild rodent plague foci were conducted on the same scale this year as last; that is, the Public Health Service maintained four mobile laboratories and the States of Washington, Oregon, Montana, Idaho, and Utah each operated one field unit during the months that most wild rodents are above ground. Material collected by these nine units was sent to the Public Health Service Laboratory in San Francisco for examination. The State of California had six field units available for plague investigations and maintained laboratory facilities for testing material obtained in the field.

Since June 30, 1937, Public Health Service mobile laboratories have operated in eight States, working in cooperation with State units in Montana, Idaho, and Utah at the request of the State health officers. Upon the request of Veterans' Bureau Hospital authorities at Fort Bayard, N. Mex., one unit investigated an epizootic among wild rodents in the vicinity of the hospital during August 1937. It was decided that this epizootic was caused by one of the *Salmonella* organisms.

During the year the laboratory at San Francisco received 1,651 specimens from the field to test for plague infection; 692 of these

were collected by State units and 959 by the Public Health Service field crews. In making the laboratory examinations, 2,320 guinea pigs were used for the original inoculations of material sent in from the field. The following consolidated tabulation summarizes the extent of plague surveys conducted in all Western States except California during the past year:

Scope of field surveys for wild rodent plague from July 1, 1937, to June 30, 1938

State	Number of counties surveyed	Rodents examined for plague					Parasites collected for inoculation		
		Ground squirrels	Mar-mots	Chip-munks	Wood rats	Miscellaneous animals	Fleas	Lice	Ticks
Washington.....	8	1,269	55	-----	4	39	7,103	418	196
Oregon.....	23	6,787	46	9	-----	254	9,223	73	25
Idaho.....	16	5,505	134	32	1	459	8,639	1,461	218
Nevada.....	4	1,909	4	1,890	964	393	4,568	52	10
Montana.....	15	10,812	120	10	11	190	17,821	63	901
Wyoming.....	8	6,057	63	40	-----	977	8,212	405	948
Utah.....	19	6,112	116	77	76	753	16,678	2,582	584
Colorado.....	14	5,938	139	92	8	1,623	9,289	61	623
Arizona.....	6	1,297	-----	46	696	2,122	7,069	81	236
New Mexico.....	1	160	4	-----	-----	11	1,833	-----	-----
Total.....	114	45,836	681	2,196	1,760	6,821	90,435	5,196	3,741

Human plague.—Only one case of human plague was reported during the year—that of a child residing in Fresno County, Calif. This child became ill a few days after having been bitten by a sick chipmunk and is the third child in the past 2 years with a history of illness following the bite of a wild rodent.

Prevalence of wild rodent plague.—This year in California plague-infected wild rodents were found only in Santa Cruz, Placer, Eldorado, Fresno, and San Bernardino Counties. At present the epizootic appears to be most active and widespread in the Sierra Nevada and San Bernardino Mountains. During the year the California Department of Public Health reported that 55 specimens received from the field were plague infected. In 36 instances plague was determined by the inoculation of fleas. Most of the positive results from tissue specimens followed the use of pooled tissues taken from animals in which no evidence of infection was observed at autopsy. In the mountain foci, where many kinds of wild rodents live in close association, plague was reported as existing among golden mantled ground squirrels (*Callospermophilus*), tree squirrels, wood rats (*Neotoma*), wild mice (*Peromyscus*), and chipmunks (*Eutamias*), as well as among California ground squirrels (*Citellus beecheyi*) which have been the reservoir of infection for many years.

During the year 61 specimens of material sent to the Public Health Service Laboratory in San Francisco for examination were found to be plague infected. Positive results were obtained in 35 instances by inoculating guinea pigs with fleas, once with lice, and 21 times with tissue taken from animals in which suspicious lesions were noted at autopsy. Although many tests have been made with ticks alone, none of the tick inoculations has ever caused plague infection. In a number of cases fleas found to be plague infested were collected

from a group of rodents that included one animal which was also found to have been sick with plague. In the course of the year, plague was demonstrated among seven species of ground squirrels; *Citellus beecheyi*; *C. grammurus*, *C. oregonus*, *C. armatus*, *C. elegans*, *C. richardsoni*, and *C. townsendi*. It was only by means of flea inoculations that the infection was found to be present among chipmunks, marmots, and desert rats, *Neotoma desertorum*. The discovery of plague among the wild rats of the desert country of south-eastern Nevada and southwestern Utah was of special significance, as it explains the manner in which the epizootic may cross the arid districts of the southwestern part of the United States.

Material found plague infected in the laboratory was collected from wild rodents in 17 counties of 7 States, of which 12 counties were new areas of infection discovered during the year under report. In June, plague was demonstrated to exist among the ground squirrels of Uinta County, Wyo., the first positive evidence of wild rodent plague in that part of the State. This focus in southwestern Wyoming represents the most eastern point at which the epizootic has thus far been determined. The following tabulation shows the counties in which plague infection was found during the year:

Demonstration of plague in the different counties and States from July 1, 1937, to June 30, 1938

State	County	Number of positive flea inoculations	Number of positive tissue inoculations	Total positive specimens inoculated
Washington.....	Adams.....	19	2	11
	Lincoln.....	1	1	2
Oregon.....	Union.....	2	2	2
	Baker.....	2	2	4
	Grant.....	2	1	3
Montana.....	Beaverhead.....	3	4	7
	Madison.....	2	2	2
	Gallatin.....	2	2	2
Idaho.....	Bannock.....	3	4	7
	Bear Lake.....	2	1	3
Nevada.....	Ormsby.....	4	4	4
	Douglas.....	2	2	2
	Clark.....	7	7	7
Utah.....	Morgan.....	1	1	1
	Wasatch.....	1	1	1
	Kane.....	1	1	1
Wyoming.....	Uinta.....	1	1	2

¹ Includes one positive inoculation from lice. Fleas and tissue from the same group of animals were also plague infected.

Flea investigations.—During the winter months experiments to test the ability of different species of fleas to transmit plague were carried on in the same manner as during the preceding year. Since this investigation was started, over 300 fleas, representing 20 different species, have been infected with plague, and 11 species (2 from domestic rats and 9 from wild rodents) transmitted plague to guinea pigs upon which they fed. Fleas taken from chipmunks, prairie dogs, and several species of ground squirrels were found capable of transmitting plague by their bites. Many microphotographs were taken of plague-infected fleas which show the masses produced by the multiplication of *Pasteurella pestis* in fleas and how these bacterial growths may obstruct the oesophagus of infected fleas. A detailed report of this work is being prepared.

In all regions where field surveys for plague are conducted, fleas are collected for identification. During the year over 30,000 fleas were received at the laboratory for classification. This work has reached such proportions that it was necessary to employ another entomologist properly to handle the flea material. Over 60 different species of fleas have already been obtained from wild rodents in regions where plague studies have been carried on.

Tularaemia.—In the course of inoculations made during the year to determine plague, six tests resulted in the death of inoculated animals from tularaemia. In five instances tularaemia followed tissue inoculations, and it was produced once by the injection of ticks. Tularaemia was found in tissue from three species of ground squirrels, *Citellus armatus*, *C. elegans*, and *C. mollis*.

PLAGUE-CONTROL ACTIVITIES IN SAN FRANCISCO

Activities in San Francisco were continued in cooperation with the city department of health, and consisted in investigating all complaints made by householders, which totaled 2,484 during the year; the trapping and poisoning of rats; autopsy examination of all rats caught by trappers or shipped to the laboratory from other San Francisco Bay points; and consultations with the city health authorities regarding rat proofing of buildings or other means of rat abatement. The city employed six additional rat catchers from February to the end of the year when they were discharged because of lack of funds. Beginning the first of September, fleas collected from San Francisco rats were inoculated into guinea pigs to determine the possible existence of rodent plague in domestic rats. During the year, 41,895 fleas were collected from 2,482 rats and 279 inoculations were made of these fleas. Rat leprosy was encountered 12 times this year at autopsy.

PUBLIC HEALTH SERVICE LABORATORY, SAN FRANCISCO

The routine work of the laboratory increased over that of any previous year because of a greater demand for serological tests as well as the examinations required by the expanding surveys for rodent plague.

Consolidated report of miscellaneous laboratory examinations at the Public Health Service Laboratory, San Francisco, from July 1, 1937, to June 30, 1938

Macroscopical examinations of rodents for plague:	
Rats caught in San Francisco and examined.....	32, 626
Rats caught in Oakland and examined.....	860
Rats from fumigated ships examined.....	112
Serological examinations:	
Wassermann reactions.....	10, 664
Kahn tests.....	10, 664
Agglutination tests.....	12
Bacteriological examinations:	
Bacteriological examinations of water.....	523
Bacteriological examinations, miscellaneous.....	97
Animal inoculation tests:	
Tuberculosis.....	52
Yaws and coccidioides.....	6
Diphtheria virulence tests.....	4
Friedman tests for pregnancy.....	9
Plague.....	2, 599

PLAGUE-SUPPRESSIVE MEASURES, ISLAND OF MAUI, TERRITORY OF HAWAII

Plague has existed in the Territory of Hawaii in recent years on the islands of both Maui and Hawaii. Operations were continued during the fiscal year in cooperation with the Territorial Board of Health only on the island of Maui.

A rather expensive but effective program of clearing gulches and other rat-infested areas to expose burrows for treatment was in force for about 2 years on Maui while funds for Works Progress Administration and other labor were available, but this work was disrupted during the fiscal year 1937 and it became necessary to develop other measures. During the period July to December 1937, cage and field experiments were carried out with various poisons and, as a result, a poisoned bait consisting of phosphorous paste and banana was developed, which, judged by rat trappers' results during the 6 months it has been in use, gives promise, when used in conjunction with other measures, of being able to kill off rats of all species quickly, regardless of the supply of natural food available. The other measures consisted in the application of calcium cyanide dust to stone walls and rock piles, the firing of exposed burrows with carbon bisulfide, and the spraying of heavily rat-infested spots with sodium arsenite solution.

A plague-infected rat was found on September 3, 1937, in the old plague zone at the residence of a farmer about 15 miles from the port of Kahului. However, extensive search in and around this residence failed to locate any further evidence of plague in rodents.

On November 4, 1937, it was found by mass inoculation that plague was present in a district adjacent to and centering about 3 miles from the September case. This entire district was thoroughly combed for rats; and during the period December 3 to 16, six plague-infected rats were located. This focus was in the old Makawao plague zone about 12 miles from the port of Kahului. No plague in rodents has been found on Maui since December 16, 1937.

On December 29, 1937, a Filipino laborer employed in the mill of a sugar plantation company at Puunene and living in a company camp house about 3 miles from the port of Kahului became ill and died on January 5, 1938. Post-mortem findings indicated that death was caused by bubonic plague. Plague had never been found in rats in the Puunene region, and the camp and mill were practically rat free. Careful investigation revealed that the victim had been off duty for several days at the approximate time of infection and had visited in and around the area in Makawao where the six plague-infected rats had been found earlier in the month. From this and other information it was concluded that the most probable source of infection was the Makawao focus.

The control measures begun in December 1937 have had a marked effect on the rate of rat catch, evidenced by a gradual reduction from 6.25 rats per 100 traps per day in December to 2.37 in May.

In addition to the direct measures employed for killing off rats, a program of ratproofing of buildings and elimination of rat harborages and the rats' food supply in and around buildings was carried out.

The following table gives data concerning the work accomplished on the island of Maui during the fiscal year ended June 30, 1938:

Classification of rodents trapped and killed:	Number
<i>R. hawaiiensis</i>	47, 095
<i>R. alexandrinus</i>	9, 723
<i>R. rattus</i>	4, 177
Unclassified.....	7
<i>M. musculus</i>	23, 659
Mongoose.....	49
Total number of rats trapped.....	59, 036
Number of rats trapped in port of Kahului.....	1, 725
Number of—	
Rats killed by shooting, etc.....	1, 649
Rats found dead.....	317
Rat-trap days, total.....	1, 199, 944
Rats per 100 traps per day (all districts).....	4. 80
Rats per 100 traps per day (Kahului).....	2. 51
Man-hours, rat harborage elimination.....	144, 389
Acres of land cleared.....	292
Burrows treated with carbon bisulfide.....	42, 931
Poison-box days.....	334, 177
Inspections of buildings and premises.....	4, 318
Reinspections of buildings and premises.....	3, 032
Dwellings built or ratproofed.....	131
Dwellings repaired and ratproofed.....	243
Houses connected to sewer.....	119
Rats received at laboratory.....	61, 002
Rodents received at laboratory, total.....	84, 710
Rats examined macroscopically.....	59, 892
Rats examined microscopically.....	20
Mass inoculations made (Kahului).....	36
Mass inoculations made (others).....	241
Single inoculations made.....	11
Cases of rodent plague.....	8
Cases of human plague.....	1

Date of last case of rodent plague: December 16, 1937.

Date of last case of human plague: December 29, 1937.

ENVIRONMENTAL SANITATION ACTIVITIES

The administration of environmental sanitation activities of the Public Health Service was continued as heretofore under the immediate direction of a section of the Domestic Quarantine Division. District offices for the administration of the work in close contact with field problems are located at New York, N. Y., Washington, D. C., Chicago, Ill., New Orleans, La., and San Francisco, Calif. Other field offices which come under the supervision of the section include the Office of Stream Sanitation at Cincinnati, Ohio, and the Office of the Regional Consultant for the technical supervision of the Works Progress Administration project for the sealing of abandoned bituminous coal mines, located at Pittsburgh, Pa.

The principal activities of these field units may be summarized as follows:

1. Supervision of water supplies used for drinking and culinary purposes by common carriers operating in interstate traffic, including the certification of the water supply sources in cooperation with the several State health departments.

2. Maintenance of sanitary conditions on common carriers operating in interstate traffic, including inspections of water supply systems of vessels, water and food handling facilities of railroads and other

common carriers, and investigations of allied problems having a sanitary significance.

3. Cooperation with the authorities of shellfish-producing States in the continuance of efficient State control over the sanitary aspects of the shellfish industry and in the endorsement of the certifications of the States relative to interstate commercial shippers of shellfish.

4. Cooperation with the State health departments in public health engineering matters, including consultation service on technical problems in connection with the health programs being developed by the States under Title VI of the Social Security Act.

5. Cooperation with other agencies of the Federal Government and other branches of the Public Health Service on matters of environmental sanitation with respect to water supplies, sewage disposal, stream pollution, plumbing, milk sanitation, mosquito and malaria control, and other allied subjects.

6. Cooperation by the Office of Stream Sanitation with States and Federal agencies having stream pollution problems involving Federal interests or concerning which consulting technical service is needed, and the preparation of special reports of studies or investigations on certain aspects of these problems.

7. Miscellaneous activities, such as the preparation, publication, and distribution of public health engineering abstracts and the maintenance of cooperative relationship with organizations interested or engaged in improving the public health, with particular respect to sanitary engineering.

Special activities carried on during the year 1938 included:

a. Completion of reports and the issuance of a published summary of the results of plumbing inspections of Federal buildings in New York, N. Y., and Detroit, Mich., carried out in cooperation with the Works Progress Administration.

b. Providing, in cooperation with the State health departments, technical supervision of the Works Progress Administration projects for the sealing of abandoned bituminous coal mines.

c. Providing, in cooperation with the District of Columbia authorities, technical supervision of a Works Progress Administration project for the control of mosquito breeding.

SUPERVISION OF WATER SUPPLIES USED BY COMMON CARRIERS

In cooperation with the State health authorities of all the States, the Public Health Service continued to engage in the certification of water supplies used for drinking and culinary purposes by common carriers operating in interstate traffic, including railroad, vessel, airplane, and bus companies. This work is directed towards preventing the transmission of water-borne diseases among the several States. During the calendar year 1937, common carriers operating in interstate traffic reported 2,225 water supplies, of which 1,847 were public supplies, as sources of drinking and culinary water used on their equipment. Of these supplies 2,090, or 94 percent, were inspected during the year by State health department engineering personnel and recommended to the Public Health Service for certification. A total of 4,048 certificates was issued to common carriers by the Public Health Service following these inspections. Upon the recommen-

dation of State health officers, 66 supplies were prohibited for use because of lack of sanitary safeguards or on account of the existence of potential hazards to health involved in the use of these particular supplies.

With the availability of Federal grants-in-aid and loans for water-works improvements, many municipal water supplies used by interstate carriers have been improved. A number of the State health authorities have been able to increase the effectiveness of the supervision of water supplies within their States and have required more definite compliance with the recognized sanitary requirements before recommending water supplies for favorable certification. This improvement has been to a large extent the result of a stimulus given to the public health engineering work of the States through the operation of Title VI of the Social Security Act.

Contaminated drinking water from a well at an eating place used by passengers of an interstate bus line was responsible for at least 52 cases of typhoid fever and 6 deaths in Indiana and several other States in April and May 1938. The busses which stopped at the eating place did not carry drinking water, and the outbreak illustrates the problems arising from the changing nature of the methods of interstate travel and the possible means by which persons traveling interstate can acquire water-borne disease from a source for which the common carrier is not responsible. Following this outbreak, the State health officer of Indiana suggested certain remedial measures which should be of help to other State health authorities in their consideration of measures directed toward lessening the likelihood of other outbreaks of this kind. The recommended measures were as follows:

1. Establishment, in all cities and counties throughout the country, of full-time local health units with adequate personnel to inspect all semipublic water supplies.
2. Strengthening of the State laws regarding the inspection of water supplies.
3. Regular inspection and grading of sanitation and water supplies of all restaurants and other eating places.
4. Searching inspection of all interstate bus eating places.

VESSEL SANITATION

Vessels engaged in interstate traffic are required to comply with certain requirements for protecting the sanitary quality of drinking and culinary water while it is being stored and distributed for use. A total of 1,248, or 69 percent, of the 1,816 vessels coming within the scope of the regulations during the calendar year 1937 were inspected and issued favorable certificates. Because of inability of the field personnel to reach certain vessels, temporary certificates were issued to 422 vessels, or 23 percent of the total number under supervision, on the basis of shipmasters' certified statements that the vessels were complying with the regulations. "Not approved" certificates were issued to 12 vessels where there was repeated failure to comply with the regulations.

Regulatory work of this character consumes a great deal of time, but it is difficult to demonstrate the effect of the supervisory procedure except through the knowledge that the constant repetition of the

activities carried on has gradually raised the level of sanitation among common carriers in this country and that there has been a declining trend in the incidence of typhoid fever cases traceable to vessels operating in interstate traffic. Fifty-three cases of typhoid fever involving vessels were reported during the year. Twenty-three cases involved either American or foreign-owned vessels operating in foreign traffic and not coming within the jurisdiction of the interstate quarantine regulations. Thirteen cases occurred on vessels operating in interstate traffic, 3 of which were Great Lakes vessels. Five cases were from Government-owned vessels and 12 were from miscellaneous harbor vessels and other craft.

Plans for the water supply systems of 22 new vessels were received for review. The development of the ship construction program of the United States Maritime Commission has increased the number of plans being submitted by the shipyards for review. It is not unusual now for vessel specifications to require that shipbuilders obtain the approval of the Public Health Service of the proposed water supply and other sanitary facilities, although the vessels may be intended under normal operations for service other than in interstate traffic where the interstate quarantine regulations apply.

Eight hundred eighty-three samples of water from the drinking and culinary water supply systems of vessels operating in interstate traffic on the Great Lakes and the inland rivers were examined bacteriologically by the laboratories of local health departments participating in a cooperative arrangement with the Public Health Service under which the local authorities collect and examine the samples. The district representatives of the Public Health Service receive the reports, tabulate the results of the examinations made at the various ports for the vessels, and notify the vessel operators of necessary precautionary measures for disinfection of the vessel water supply systems in instances when the examinations indicate the water is not satisfactory.

In connection with the supervision exercised over matters of sanitation on vessels operating in interstate traffic, attention was given to other items of importance in addition to water supply protection. Dining rooms and other food-handling departments of vessels were inspected regularly during the annual inspections. Particular attention has been given to improving the quality of the milk supplies of vessels. Definite progress has been made in bringing Grade A pasteurized milk into general use on vessels. Because of outbreaks of cases of gastro-intestinal illness among passengers and crews of certain "cruise" vessels, special studies were made aboard these vessels in an effort to determine the cause. Investigations were made of the water supply systems of several United States Army transports at the request of the military authorities.

RAILWAY SANITATION

During the year, the procedure for the certification of water supplies used for drinking and culinary purposes by common carriers was extended to provide for inspection, by the State health authorities, of the methods employed by the carrier companies in handling the water on their properties, in addition to inspection of the water

supply systems delivering the supplies to the carriers. As a railroad yard, vessel pier, airport, or bus terminal is as much under the control of the State and local health authorities as is any other quasi-public place, this development, undertaken after consideration of the proposal by the Conference of State and Territorial Officers, is a logical one. Several of the States have carried out inspections of this kind in the past, but for the majority of the State health authorities it is a new procedure. Work was undertaken in a number of the States in furnishing assistance in training State personnel in the details of the inspection procedures involved in railway coachyard sanitation.

Inspections were made by Public Health Service personnel of 268 coachyards, 285 watering points and terminals, and of 250 dining cars and commissaries. While coachyard and watering point facilities inspections will be made more frequently by the State health department personnel in the revised procedure calling for their cooperation on this inspectional work, it will be important nevertheless that the Public Health Service personnel continue to make supplementary inspections of the larger coachyards and terminals where most of the railroad car watering operations are carried on. The inspections of the railroad dining cars and commissaries have demonstrated that, in general, the sanitary conditions are maintained in an excellent condition. Emphasis has been placed upon the use of only Grade A pasteurized milk on dining cars in areas where it is available. If there is no such milk produced in the area covered by the dining car run, the next best pasteurized milk that can be found is required to be used. There is provision for the serving of certified milk if a passenger should desire it; but unless otherwise specified by the patron, Grade A pasteurized milk or its equivalent must be served. The present procedure for milk control on dining cars involves a systematic check through the State health authorities to assure that the milk producers concerned are complying with the State regulations for pasteurized milk. By this procedure, the use of raw milk on dining cars is being eliminated and the best grade of pasteurized milk available is being provided.

SHELLFISH SANITATION

Since 1925, under a voluntary agreement with the several States, the Public Health Service has acted as a clearing house for information concerning the adequacy of sanitary control of the shellfish industry in the shellfish-producing States, to enable the consuming States to protect themselves against the danger of spread of disease from shellfish produced under unsafe conditions. Wherever the Public Health Service can be assured, as a result of its own inspections and observations, that sanitary control of the shellfish industry within a producing State may be considered sufficiently reliable to give reasonable protection to the consumer, the Public Health Service furnishes, as a convenience, to both the producing and the consuming States, information regarding the reliability of the State control measures. This is accomplished by giving the endorsement of the Public Health Service to the certifications issued by the States to interstate shippers. In entering into this agreement the Public Health Service has reserved the right to withdraw its endorsement

at any time when it may have good reason to believe that the State's control measures are inadequate.

Under this procedure the certifications of 19 States were endorsed during the fiscal year, and the names of 1,974 shippers certified by shellfish-producing States were included in the semi-monthly published lists of shellfish growers and shippers of States whose control measures could be endorsed by the Public Health Service. Five hundred and forty shucking and packing plants and 26 growing areas were inspected during surveys to determine the efficiency of State control. The inadequacy of control measures in one State continued to prevent endorsement of the State's certifications. At the close of the fiscal year it was necessary to inform an additional State that unless steps were taken to institute proper control measures and to maintain them effectively, the Public Health Service would be compelled to withdraw its cooperation and to discontinue the endorsement of interstate shippers' certifications issued by the State. Assurance was received subsequently from the State authorities that the State's control activities would be reorganized on a satisfactory basis.

COOPERATIVE WORK IN PUBLIC HEALTH ENGINEERING

COOPERATION WITH STATES

Increased cooperation has been furnished to the State health departments in the form of advisory service in connection with the development of public health engineering activities related to public water supply protection, sewage and industrial waste treatment, and other matters of environmental sanitation. Since the providing of public health engineering assistance to communities and local health units is one of the more important activities of the State health departments, the utilization of the technical facilities of the Public Health Service in this field fulfills a most useful purpose. Assistance has been given to the regional consultants of the Public Health Service in reviewing the sanitation features of proposed State budgets under Title VI of the Social Security Act.

COOPERATION WITH OTHER FEDERAL AGENCIES

Assistance given to other Federal agencies and other branches of the Public Health Service in matters of public health engineering has continued to demand a large amount of the time of the engineering personnel in addition to their regular prescribed duties. The development of Federal building programs and emergency relief activities has caused an increasing trend in the requests for technical assistance on the manifold subjects embraced in the sanitation field. During the fiscal year, 34.5 percent of the time of the engineering staff of the Domestic Quarantine Division was devoted to work of this kind. The providing of technical assistance of this nature to the various Government departments has been a most effective and economical function in that duplication of activities and personnel has been avoided and consulting service that could not be obtained elsewhere for the same cost has been made available. Recommenda-

tions on design and construction of governmental sanitary works have been made which resulted in a distinct saving of Federal funds.

Agencies of the Federal Government given the most assistance in this respect were the National Park Service, Office of Indian Affairs, the District of Columbia, and the United States Lighthouse Service, which obtained 626, 424, 157, and 131 days of engineering service respectively. Other Federal agencies which received public health engineering assistance during the year included the following: Treasury Department: Coast Guard Service, Procurement Division; War Department: Corps of Engineers, Medical Department, Ordnance Department, Quartermaster Department; Department of Justice: Bureau of Prisons; Post Office Department; Navy Department: Bureau of Aeronautics, Bureau of Medicine and Surgery; Interior Department: Indian Service, National Park Service; Department of Agriculture: Bureau of Entomology and Plant Quarantine, Farm Security Administration, Forest Service; Department of Commerce: Lighthouse Service; Department of Labor: Immigration and Naturalization Service; independent establishments: District of Columbia, Federal Housing Administration, Federal Trade Commission, National Resources Committee, Social Security Board, Tennessee Valley Authority, Works Progress Administration.

STREAM SANITATION

During the past year the consulting and advisory services of the Office of Stream Sanitation were materially expanded, there having been a constantly increasing number of requests for advice and cooperative assistance from Federal, State, and other agencies interested in water pollution abatement.

Major activities of the Office of Stream Sanitation included cooperation with the Water Resources Committee, the Ohio Valley Regional Planning Board of the National Resources Committee, the Tennessee Valley Authority and the State health agencies of the Tennessee River watershed, the Works Progress Administration, the Ohio River Committee, the Office of Malaria Investigations of the Public Health Service, the State health authorities of Minnesota, Mississippi, New York, North Dakota, Tennessee, and Texas, the local Stream Pollution Committee of the Cincinnati Chamber of Commerce, and the Ohio Valley Improvement Association.

Special reports and papers included a study of the effect of the proposed flood control program of the Army Engineer Corps on existing pollution in the Ohio River; an article on new facts regarding sanitary organization and legislation, prepared for a meeting of the Permanent Committee of the International Health Office in Paris; a paper on the pollution problem in the Ohio River drainage basin, presented at the March meeting of the Ohio Valley Improvement Association and made available in the Public Health Reports; and a paper on water pollution problems and water pollution abatement presented at a meeting in Pikeville, Ky., before citizens interested in stream pollution control. As in past years, a course of lectures was presented to the class of trainees in public health engineering at the University of Minnesota sponsored by the State Department of Health and the University.

OHIO RIVER COMMITTEE

At the request of the Ohio River Committee, authorized by the President to have general supervision over a survey of the pollution of the Ohio River and its tributaries for the purpose of determining the points where remedial measures are now or shortly will be required, the extent of such measures necessary and their probable cost, the Office of Stream Sanitation assisted in laying out and estimating the cost of several programs for intensive pollution studies which would include the effects of sewage, industrial wastes, and acid mine drainage.

An engineer officer of the Public Health Service designated by the President served during the year as a member of this committee, which consisted of three members, namely, an officer of the Corps of Engineers, United States Army, a representative of the Public Health Service, and a civilian expert on water pollution control.

WATER RESOURCES COMMITTEE

The Public Health Service was represented by an engineer officer on the Water Resources Committee and the Special Committee on Water Pollution and by a medical officer on the subcommittee on drainage. The district engineers represented the Public Health Service at the meetings of the drainage basin committees which studied and revised the basin project lists compiled by the National Resources Committee as a result of the drainage basin studies made throughout the United States in the summer of 1936.

RECIPROCITY WITH CANADA

The reciprocal arrangements with the Department of Pensions and National Health of the Dominion of Canada for the inspection and certification of drinking and culinary water supplies used by international carriers, the endorsement of certifications of international shellfish shippers, and the inspection of dining cars operated internationally continued on the same basis of international cooperation as has existed in the past. The Canadian authorities were supplied with 12 reports on water supplies located in the United States and used by the United States carriers operating in Canada, and with 50 certificates covering water supplies in the United States used by Canadian carriers. The Department of Pensions and National Health of Canada, in turn, supplied the Public Health Service with 45 certificates on Canadian water supplies used by United States carriers operating in the Dominion.

Copies of all certificates issued shellfish shippers by the producing States under the Public Health Service endorsement were supplied to the Canadian authorities and 82 certificates on Canadian shippers were supplied to the Public Health Service.

SPECIAL ACTIVITIES

A series of reports covering the inspections of the plumbing facilities of Federal buildings in New York City and Detroit, Mich., which

had been made under a Works Progress Administration project during the period May 1936 to June 1937, were prepared and transmitted to the governmental agencies concerned for their information and guidance. A summary report of the work entitled, "Public Health Hazards in Plumbing" was issued in multilithed form for general distribution, which was reprinted either in whole or in part by a number of the plumbing trade journals.

There was assembled also during the year material for a bulletin which should be useful as an instrument of instruction for health departments and of educational value to the public on the relationship of plumbing to public health. The text of this proposed bulletin was available for publication at the close of the fiscal year, but because of the limited funds available for printing, action on printing the manuscript was being held in abeyance.

A number of technical papers were prepared during the year, among which were the following: "Disapproved Plumbing—How Dangerous is it?"; "Effect of Certain Small Filters on Bacteria Count"; "Effects of Industrial Wastes and Sewage on Shellfish and Fin Fish"; "Essentials of an Effective State Plan and Program of Activities for Flood Sanitation" (in cooperation with the Chief Sanitary Engineer, Illinois State Health Department); "Health Factors in Connection with Water Supplies and Sewage Disposal in Industrial Communities"; "Planning the Organization and Conduct of Stream Pollution Surveys"; "Report of 1,000 Tests on Drinking Water Found on Trains"; "Sewage Sludge Disposal"; "Stream Pollution in the United States"; "Trends in Shellfish Sanitation"; and "Uniform Requirements for Sanitation as Applied to State and National Parks."

MOSQUITO CONTROL IN THE DISTRICT OF COLUMBIA

Supervision over mosquito control activities in the District of Columbia was continued with satisfactory results. Some of the outworn motorcycle equipment used in oiling was replaced with light trucks confiscated by the Alcohol Tax Unit and transferred to this office.

Comparative trap records of mosquitoes caught during the past two seasons indicate that a slightly more effective control was obtained during the fiscal year ending June 30, 1938, than in the previous year. Average catches per trap per week were 3.00 during 1937 and 2.25 during 1938.

Practically no complaints regarding mosquito annoyance were received. Some publicity for the project, to the end that persons annoyed by mosquitoes would know to what agency to address requests for relief, would be helpful in providing more efficient control.

WORKS PROGRESS ADMINISTRATION PROJECTS

COMMUNITY SANITATION

The filth-borne diseases are most prevalent in small towns and rural districts. This is because of the lack of adequate sanitary facilities in many such communities. In the absence of municipal

water and sewage works, the only protection against filth-borne diseases is the disposal of human excreta so it will not be accessible to flies and will not pollute private water supplies or the surface of the ground.

The greatest impetus ever given to the sanitation of small communities in this country has been supplied by the Emergency Relief Community Sanitation Program. This program was inaugurated under the Civil Works Program in December 1933, and continued in turn under the Federal Emergency Relief and Works Progress programs. During the fiscal year 1938, the project was conducted on substantially the same plan as in 1937. Funds made available by the Works Progress Administration enabled the Public Health Service to furnish technical supervisory personnel to the State health department in each State in which Works Progress Administration community sanitation projects were in operation, for the purpose of insuring that the work would be done properly.

Community sanitation projects were in operation in 1,157 counties in 39 States, 16,741 relief workers being employed on the work at the beginning of the fiscal year. The extent of operations varied with the labor supply during the year. The peak of activity was reached during the period June 15-30, 1938, when projects were in operation in 1,314 counties and 23,057 workers were employed. The low mark was reached during the period November 1-15, 1937, when 15,328 workers were employed on the projects in 1,007 counties. The monthly average number of workers assigned to the projects was 18,624, while the average number of counties in which projects were in operation was 1,162, for the fiscal year.

The accomplishments for this fiscal year included the installation of 399,271 sanitary privies, the restoration of 21,260 insanitary privies to a sanitary condition, the construction of 199 septic tanks on public property and the laying of 68,168 feet of absorption field to provide proper disposal of the effluent from the septic tanks installed.

Through this work, 420,730 homes, schools, churches, dairies, and other places in the urban and rural sections of the country, where either no sanitary facilities existed or insanitary facilities were in use, were provided with a satisfactory method of excreta disposal as a protection of the community against the filth-borne group of diseases.

As was anticipated, the number of localities in which the work was carried on during this fiscal year was less than in the previous year. This was partially due to the fact that the average number of workers employed and the number of counties in which projects were in operation were less than in the previous year. More than 80 percent of the units installed were of the concrete type as against 69.6 percent of this type constructed in the previous year.

An accompanying table shows the average number of counties in which the projects were operated, the average number of workers employed, and the total number of privies installed in each State during the fiscal year.

Another table shows in detail the States in which the program was in operation and the number of sanitary privies constructed under each of the emergency relief programs from December 16, 1933, through June 30, 1938. It will be noted that 1,774,689 sanitary

privies had been installed as of June 30, 1938. Although this number may seem large, it still represents only a small proportion of the number of sanitary privies actually needed to provide a safe method of excreta disposal in small communities and rural areas where sewer systems are not available. It will also be noted from this table that the projects have been in operation, on the average, in about 41 percent of the counties in the 39 States.

The support given the work by the officials of the Works Progress Administration both in Washington and in the field was an important factor in the successful prosecution of the program.

It is not possible to show definitely what percentage of reduction in the filth-borne group of diseases can be attributed to the work done under the community sanitation program, because certain other factors such as immunizations and the protection of public water and milk supplies operate in the control of these diseases. However, although definite data are not available, it is considered reasonable to assume that the improvement in environmental sanitation brought about through the operation of the program has been a potent factor in the reduction of excreta-borne illness and that the work has effectively served the purpose for which it was inaugurated. Aside from the actual construction work accomplished, the program has been of tremendous value from an educational standpoint and the cost could well be justified on this basis alone.

The fabrication and installation of an average of about 32,265 sanitary privies per month during the past 55 months have amply demonstrated that the community sanitation projects are particularly well suited for operation under the emergency relief program since they may be expanded or contracted on short notice as fluctuations occur in the availability of labor. The proportion of funds contributed by the sponsor is relatively high, averaging around 35 percent of the total cost in practically all cases. Since it is apparent that much more remains to be done than has been accomplished up to this time, the program should be continued, and, if possible, expanded, in order that the population living in the unsewered areas of the United States may be afforded protection against the filth-borne diseases.

The arrangement for an officer of the Public Health Service to serve as liaison officer between the Works Progress Administration and the Public Health Service which was made in October 1935 was continued during this fiscal year. Likewise, the same plan of clearance of community sanitation, malaria control drainage, sealing of abandoned coal mines projects, and other projects relating to public health was also continued with satisfactory results.

Average number of counties, by States, in which W. P. A. community sanitation projects were in operation, average number of workers employed, number of sanitary privies installed, and the number and percentage which were of the concrete slab type during the period July 1, 1937-June 30, 1938

State	Number of counties in State	Average number of counties operating	Average number of workers employed	Total number of privies installed	Total number of concrete privies	Percentage of concrete privies
Alabama.....	67	17	336	5,066	4,995	99
Arizona.....	14	13	131	4,140	4,140	100
Arkansas.....	75	19	317	6,327	6,327	100
California.....	58	13	264	3,876	3,876	100
Colorado.....	63	24	361	4,864	4,864	100
Delaware.....	3	3	36	714	714	100
Florida.....	67	22	354	6,162	4,656	76
Georgia.....	159	35	328	7,954	4,863	61
Idaho.....	44	21	223	4,153	4,153	100
Illinois.....	102	54	749	12,797	12,797	100
Indiana.....	92	81	1,009	18,608	18,608	100
Iowa.....	99	13	204	2,982	2,982	100
Kansas.....	105	52	721	14,418	14,418	100
Kentucky.....	120	43	520	11,376	11,376	100
Louisiana.....	64	25	469	11,976	4,340	36
Maryland.....	23	3	77	1,763	843	48
Mississippi.....	82	71	1,064	24,342	24,178	99
Missouri.....	114	6	67	*424	424	100
Montana.....	56	19	210	3,693	3,693	100
Nebraska.....	93	49	574	10,248	10,248	100
Nevada.....	17	5	70	656	656	100
New Jersey.....	21	17	368	5,677	5,677	100
New Mexico.....	31	6	88	2,496	2,496	100
North Carolina.....	100	53	939	32,392	21,482	66
North Dakota.....	53	46	475	8,106	8,106	100
Ohio.....	88	21	412	6,124	6,124	100
Oklahoma.....	77	21	431	9,740	9,740	100
Oregon.....	36	15	188	2,609	2,609	100
Pennsylvania.....	67	58	956	15,652	15,652	100
South Carolina.....	46	46	899	23,177	21,224	92
South Dakota.....	69	37	486	10,343	10,343	100
Tennessee.....	95	54	1,224	35,644	10,928	31
Texas.....	254	41	1,103	13,552	13,552	100
Utah.....	29	8	191	3,269	3,269	100
Virginia.....	100	49	556	29,126	5,449	19
Washington.....	39	13	269	3,404	3,404	100
West Virginia.....	55	50	1,461	35,914	35,914	100
Wisconsin.....	71	28	368	3,953	3,953	100
Wyoming.....	23	11	126	1,554	1,554	100
Total (39 States).....	2,771	1,162	18,624	399,271	324,627	81.30

*Multiple units—schools.

Number of new privies installed in each State from week ending Dec. 16, 1933, to June 30, 1938, under C. W. A., E. R. A., and W. P. A. programs (as compiled from reports submitted by various State health departments)

State	Privies installed under W. P. A. program			Total number of privies installed under C. W. A. and E. R. A. programs	Total number of privies installed under C. W. A., E. R. A., and W. P. A. programs to June 30, 1938
	July 1, 1935 to June 30, 1937 ¹	July 1, 1937 to June 30, 1938	Total, July 1, 1935 to June 30, 1938		
Alabama.....	4,995	5,066	10,061	3,256	13,317
Arizona.....	7,785	4,140	11,925	250	12,175
Arkansas.....	35,793	6,327	42,120	27,548	69,668
California.....	14,260	3,876	18,136	1,872	20,008
Colorado.....	10,739	4,864	15,603	-----	15,603
Delaware.....	926	714	1,640	168	1,808
Florida.....	4,008	6,162	10,170	9,187	19,357
Georgia.....	15,713	7,954	23,667	19,687	43,354
Idaho.....	8,558	4,153	12,711	-----	12,711
Illinois.....	19,806	12,797	32,603	2,801	35,404

¹ Number installed July 1, 1936-June 30, 1937, 470,009.

Number of new privies installed in each State from week ending Dec. 16, 1933, to June 30, 1938, etc.—Continued

State	Privies installed under W. P. A. program			Total number of privies installed under C. W. A. and E. R. A. programs	Total number of privies installed under C. W. A., E. R. A., and W. P. A. programs to June 30, 1938
	July 1, 1935 to June 30, 1937	July 1, 1937 to June 30, 1938	Total, July 1, 1935 to June 30, 1938		
Indiana.....	50,652	18,608	69,260	25,228	94,488
Iowa.....	4,435	2,982	7,417	376	7,793
Kansas.....	17,409	14,418	31,827	8,037	39,864
Kentucky.....	29,183	11,376	40,559	18,006	58,565
Louisiana.....	11,122	11,976	23,098	41,763	64,861
Maryland.....	6,022	1,763	7,785	6,481	14,266
Massachusetts ²					
Michigan ³				3,016	3,016
Minnesota ⁴					
Mississippi.....	41,617	24,342	65,959	23,227	89,186
Missouri.....	232	424	656	5,321	5,977
Montana.....	5,921	3,693	9,614	124	9,738
Nebraska.....	4,832	10,248	15,080		15,080
Nevada.....	364	656	1,020		1,020
New Jersey.....	5,071	5,677	10,748		10,748
New Mexico.....	8,805	2,496	11,301	409	11,710
North Carolina.....	45,971	32,392	78,363	62,089	140,452
North Dakota.....	12,119	8,106	20,225	443	20,668
Ohio.....	53,995	6,124	60,119	15,671	75,790
Oklahoma.....	57,086	9,740	66,826	26,534	93,360
Oregon.....	7,573	2,609	10,182		10,182
Pennsylvania.....	17,558	15,652	33,210	963	34,173
South Carolina.....	37,003	23,177	60,180	39,621	99,801
South Dakota.....	4,752	10,343	15,095		15,095
Tennessee.....	62,852	35,644	98,496	43,778	142,274
Texas.....	20,447	13,552	33,999	70,370	104,369
Utah.....	14,654	3,269	17,923	2,052	19,975
Virginia.....	70,640	29,126	99,766	26,330	126,096
Washington.....	5,926	3,404	9,330	796	10,126
West Virginia.....	87,567	35,914	123,481	75,869	199,350
Wisconsin.....	5,547	3,953	9,500		9,500
Wyoming.....	2,207	1,554	3,761		3,761
Total.....	814,145	399,271	1,213,416	561,273	1,774,689
Average per month.....	33,922	33,273	33,706		

² Discontinued June 30, 1936.

³ Discontinued Nov. 15, 1935.

⁴ Discontinued Apr. 30, 1936.

MALARIA CONTROL DRAINAGE

During the year the Public Health Service assigned technical supervisors to 16 State health departments for the purpose of extending technical supervision to malaria control drainage projects of the Works Progress Administration.

Compiled reports of accomplishment show that approximately 2,900 miles of minor hand construction malaria control drainage ditches were installed during the year. Some machine ditches for outlets were constructed, where necessary. An average of approximately 19,000 men per day were employed on this work throughout the year. It is estimated that 67,000 acres of mosquito-breeding areas producing *Anopheles quadrimaculatus* mosquitoes were eliminated during the year, and that approximately 1,315,000 people live within *Anopheles* mosquito flight range of the projects. The total ditch construction with relief labor (since the Civil Works Administration project was instituted) is about 28,900 miles.

SEALING ABANDONED BITUMINOUS COAL MINES

In cooperation with the State health departments of Alabama, Indiana, Kentucky, Maryland, Ohio, Pennsylvania, and West Virginia, the furnishing of technical supervision of Works Progress Administration projects for the sealing of abandoned bituminous coal mines was continued. Drainage water from the abandoned workings of bituminous coal mines carries excessive amounts of sulfuric acid unless the mines are adequately air sealed. The objective of the mine-sealing projects, therefore, is to prevent contamination of streams by removing the acid from mine wastes. Through the air-sealing of abandoned mines, the formation of sulfuric acid, and its discharge in mine-drainage with consequent deleterious effect on water supplies derived from the streams, is prevented.

In the seven States, work was being carried on at the end of the fiscal year in 86 counties where projects had been set up employing an average of 4,800 persons. Since the commencement of the Works Progress Administration mine-sealing program 3,300 mines have been sealed, the project involving the closure of 100,000 or more openings. The amount of acid estimated as having been prevented from reaching streams by this program is 610,000 tons annually. The amount of acid that will be excluded from the streams if work in progress at the close of the fiscal year is continued to completion is estimated as 317,000 tons annually.

The advisory service for this work has been provided by the Public Health Service through the State health departments, which have been charged with the immediate technical direction. Funds made available to the Public Health Service by the Works Progress Administration have been utilized for the employment of the supervisory personnel assigned to the State health departments. Because of a change in the method of allotting funds for this technical supervision and a considerable reduction in the amount authorized for the ensuing fiscal year, it is anticipated that the future supervisory program will be organized and developed on a somewhat modified basis.

ANNUAL CONFERENCE OF THE SURGEON GENERAL WITH STATE AND TERRITORIAL HEALTH OFFICERS

The Annual Conference of State and Territorial Health Officers with the Surgeon General was held in Washington, D. C., on April 11 and 12, 1938. Representatives from 50 States and Territories, and guests from Canada, Cuba, Mexico, Panama, and several National health organizations were in attendance. Committees on Professional Training and Qualifications, Social Security Program, Cancer and Syphilis Control, Yellow Fever, Interstate Problems, Penalty Privilege, and Records and Reports, were appointed in advance of the meeting, and recommendations on these questions were submitted, in the form of reports, to the conference for consideration. In addition to the committee reports, papers were presented on the Nationwide Organization for the Prevention of Cancer, A Proposed Automatic System for Tabulating Venereal Disease Morbidity, Clinical and Epidemiological Reports, Proposed Studies and Demonstrations in the Control of Pneumonia Morbidity by the Public Health Service, Stream Pollution Legislation, and the Status of Trichinosis Control.

NATIONAL INSTITUTE OF HEALTH

(DIVISION OF SCIENTIFIC RESEARCH)

Asst. Surg. Gen. L. R. THOMPSON, Director

The fiscal year 1938 was marked by the fruition of plans for the construction of a series of buildings on a plot of land near Bethesda, Md., presented for the purpose by the late Mr. Luke I. Wilson and Mrs. Wilson. The cornerstone of the first building to be erected on the site was laid June 30 with appropriate ceremonies. Equally important was the organization of the National Cancer Institute, functioning as a division of the National Institute of Health.

A brief description of activities of the National Institute of Health follows.

DIVISION OF BIOLOGICS CONTROL

Senior Surg. W. T. HARRISON in charge

Experimental studies of the prophylactic and therapeutic value of products recommended for use in the treatment of cancer and tuberculosis were continued during the year.

Standardization of gas gangrene antitoxins.—A comparative study of the proteolytic anaerobic bacillus (*Cl. sordellii*) which produces strong exotoxin, and *Cl. bifermentans*, which is generally considered nonpathogenic, showed these two species to be identical by morphological, biochemical, and immunological reactions. The generic name *bifermentans* was proposed for the two species, since this name has priority over *sordellii*.

A unit for determining the potency of *bifermentans* (*sordellii*) antitoxin was established, based on the unit proposed by Sordelli. Titrations were made by intravenous injections in mice.

Studies were continued on the antigenic structure of toxins of the *Cl. perfringens* group, type A toxin being found to consist of at least two distinct antigenic fractions, one of which is hemolytic for sheep and rabbit red blood cells and the other is not. The two fractions were differentiated by ultrafiltration and toxin-antitoxin reactions.

Staphylococcus preparations.—The quantitative relationships in the reaction between staphylococcus toxin and rabbit red blood cells were shown to follow the Freundlich isotherm and to vary with the temperature of incubation and with the total volume of the liquid, the reaction probably being of the nature of adsorption. The reaction between staphylococcus toxin and antitoxin as indicated by the neutralization of alpha toxin was shown to be expressible by a straight line equation of the same order regardless of the temperature of incubation and the total volume of liquid, the reaction being of the molecular equivalent type.

The hemolytic, dermonecrotic, and acute killing functions of staphylococcus toxin and the corresponding neutralizing functions of

antitoxin were shown by *in vivo* and *in vitro* experiments to be manifestations of the same cell destroying property of the toxin and the specific antitoxin. Standardization of staphylococcus antitoxin, therefore, can be limited to an *in vitro* procedure based on hemolysis of rabbit red blood cells.

Mucin was shown to increase the susceptibility of mice in experimental staphylococcemia to only a slight degree.

Studies on the meningococci.—Attention was directed chiefly toward developing a satisfactory method for the evaluation of antimeningococcic serum. Considerable progress was made in the development of a mouse protection test for this purpose. In addition, type-specific precipitins have been titrated by growing meningococci on agar plates containing varying amounts of the serum to be tested. The precipitate appears as a "halo" around the colony. The size and intensity of this halo, with a very few exceptions, showed a definite correlation with the mouse protectivity of the sera. These two methods have revealed that few commercial sera contain specific antibodies for type II meningococci, though all contain antibodies for the I-III group.

In order to have cultures of maximum virulence for the mouse protection test a study of the influence of culture media on the virulence and immunological characteristics of the meningococcus has been made. Certain media were found to be much superior to others. Cultures grown on these media and occasionally passed through mice apparently maintain their original characteristics.

Strains of meningococci sent in from various parts of the country have been typed with standard type sera. This has not been an epidemic year and the number of strains studied has been small, 43 strains having been received, 26 of which were of the I-III group and 17 of type II.

It has been necessary to give attention to gonococcus meningitis and to Pfeiffer bacillus meningitis since a number of cases due to these microorganisms have come to our attention.

Studies were made of the significance of the skin test with meningococcus toxin and of its value in titrating meningococcus antitoxin.

Pneumococci.—Since correct typing of pneumococci is essential for specific therapy, studies were made of the specificity and potency of commercial diagnostic sera. A collection of 31 standard type specific strains of pneumococci was established. These strains are being kept on special culture media, with frequent mouse passage to maintain virulence, for experimental purposes and for distribution to the commercial laboratories.

Additional studies on the standardization of antipneumococcic sera were undertaken. The distribution of increasing amounts of types V, VII, and VIII antipneumococcic sera made necessary the adoption of standard control sera for those types.

Antipneumococcic rabbit serum was introduced commercially during the year, and appropriate steps were taken for the standardization and control of this product.

Pertussis vaccine.—The clinical trial of alum precipitated pertussis vaccine was continued on a somewhat larger scale in order to check the results obtained from the first trial.



PLACING THE CORNERSTONE OF THE NEW NATIONAL INSTITUTE OF HEALTH
ADMINISTRATION BUILDING AT BETHESDA, MD., JUNE 30, 1938.

Left to right—Secretary of the Treasury Henry Morgenthau, Jr., Mrs. Luke Wilson, whose husband
donated the site, and Surgeon General Thomas Parran.

Tuberculin.—A study on the standardization of diagnostic tuberculin in animals is in progress with a view to correcting the wide variation in potency of the diagnostic materials. This study is also directed toward the adoption of a control tuberculin for distribution to the manufacturers.

Smallpox vaccine.—Since the introduction of modifications of the classical smallpox vaccine prepared in the skin of the calf it has appeared desirable to check the immunizing properties of these newer products, using calf vaccine as the standard. Such studies are under way and should be completed during the fiscal year 1939.

Arsenical preparations.—Studies on the therapeutic efficacy of neoarsphenamine in the rabbit were continued. The observations recorded previously, that various brands of neoarsphenamine are apparently uniformly efficient and that the virulence of the infection may influence the therapeutic efficacy of the drug, were supported in studies made during the year.

Investigation of the stability of the arsphenamines demonstrated the necessity of revising the regulations to include an expiration date, an increase of temperature and exposure time in the stability test, and for neoarsphenamine a maximum moisture content.

Licensed establishments.—At the close of the fiscal year, 61 establishments, 14 of which were foreign, held licenses to engage in the interstate sale of biologic products. The licenses covered 166 different preparations.

DIVISION OF CHEMISTRY

Prof. CLAUDE S. HUDSON, in charge

Sugar researches.—Studies were continued on oxidations in the carbohydrate group. The usefulness of the cleavage type of oxidation as a means of studying the structure and configuration of the carbohydrates, both the simpler sugars and the polysaccharides, has been further demonstrated. Periodic acid and sodium metaperiodate still prove to be the best of the reagents for accomplishing this type of oxidation. This oxidation reaction has been applied to starch, cellulose, sucrose, levoglucosan, trehalose, raffinose, β -methyl-*d*-mannopyranoside, β -methyl-*d*-galactopyranoside, β -methyl-*d*-glucoheptoside, α - and β -methyl-*d*-mannoheptosides, α -methyl-*d*-lyxoside, α - and β -methyl-*d*-fucosides, and β -methyl-*d*-isorhamnoside.

The oxidation studies have been extended to include the alkaline oxidation of reducing sugars by means of oxygen. This reaction produces the salt of an aldonic acid by removal, through cleavage, of the first carbon atom in aldehyde and ketone sugars. This degradation should lead to the production of some of the rarer sugars, their derivatives and transformation products. It should also furnish an excellent method for proving the structure and configuration of certain higher sugars.

The systematic study of the preparation and properties of the higher sugars and their derivatives was continued. The conversion of α -*d*-glucoheptose to the two possible glucooctonolactones was investigated, and the α , α - and α , β -*d*-glucooctoses prepared. Crystalline β -*d*-glucoheptose dibenzyl mercaptal was obtained for the first time.

The α - and β -methyl-*d*-[α -mannoheptoside] pentaacetates were differentiated chemically; the alpha isomer appears to vary in rotation without showing a change in melting point. A similar case of two apparently different forms of the alpha isomer, showing the same melting point but differing in rotation, was found in two new calcium chloride compounds of α -*d*-[α -mannoheptose].

Several studies were made on the higher sugars related to galactose. The structure of perseulose as *l*-galaheptulose was proved by three independent methods, namely, by comparison of the phenylosazone and its acetate, and the two derived heptitols and their acetates, with the corresponding known compounds in the *d*-series; and by its oxidative degradation to *l*-galactonic acid. The study of a series of open chain derivatives of *d*- α , α -galaoctose was completed. The new α -methyl-*d*- α , α -galaoctoside, its hexaacetate, and β -methyl-*d*- α , α -galaoctoside were prepared. In the galanonose series the important *d*- α , α , α -galanononolactone was successfully crystallized for the first time.

The catalytic hydrogenation of twelve sugars to the corresponding alcohols has furnished considerable material for a study of the bacterial oxidation of these alcohols. Since the identification of the sugar alcohols, including those derived from natural sources, is difficult because of their low optical rotations, the systematic preparation of their higher rotating acetates is being continued.

The benzimidazole bases formed by condensing *o*-phenylene-diamine with various aldonic acids have been found extremely useful in resolving racemic acids. Thus, with 2-[*d*- α -glucohepto-hexahydroxyhexyl]-benzimidazole, a 95 percent recovery of *l*-tartaric acid from the *dl*-form has been obtained readily.

Other sugar researches included phase rule studies on the *d*, *l*, and racemic forms of arabitol, its acetate, arabinose diethyl mercaptal, and its acetate; a study of the thio- β -naphtholglycosides and their acetates, derived from *d*-xylose, *d*-arabinose, *d*-glucose, *d*-galactose, cellobiose, lactose, and maltose; and a study of the α - and β -methyl-*d*-isorhamnosides and a number of intermediates and their derivatives encountered during their preparation from α -methylglucoside and β -glucosan, respectively.

Enzyme researches.—The two new adsorbents for invertase previously reported; namely, the clay known as bentonite, and zinc sulfide were investigated further. Starting with bakers' yeast as the source of the invertase and using zinc sulfide as the adsorbent, it was found possible to obtain invertase solutions of time value 0.20 minute. Using enriched brewer's yeast as the source of the invertase and applying two treatments with bentonite, invertase solutions were obtained showing a time value of approximately 0.15 minute.

Chemico-bacteriological studies.—The oxidation of perseitol to perseulose by *Acetobacter suboxydans* was investigated. It was found to proceed rapidly and quantitatively in a phosphate-yeast extract medium in the presence of a minute amount of glucose, the bacterial oxidase being apparently activated by glucose. Strains of *B. macerans* from several different sources (soil, water, potato) have been rendered efficient in production of crystalline dextrans from starch by suitable conditions of cultivation. The yields of β -dextrin obtained were considerably larger than those reported by previous workers.

Biological fluoride studies.—The studies to determine quantitatively the effect of the ingestion of sodium fluoride in the food as compared with ingestion in the drinking water have been continued. It was found that, under the conditions of the experiments, the average retention of fluorine by young growing rats was about 30 to 40 percent of the intake, regardless of whether the fluorine was administered with the food or the drinking water. The major portion of the fluorine retained by the experimental rats was found deposited in the bones.

Studies on fluoride in drinking waters.—In continuation of studies relating to the human dental lesion known as mottled enamel, monthly samples of the drinking waters were received for chemical analyses, including fluoride determinations, from Amarillo and Wichita Falls, Tex. Samples of drinking waters were also received for similar analyses from 4 locations in Arkansas, 2 in Colorado, 3 in California, 3 in Virginia, 1 in North Dakota, and 20 in South Dakota.

In connection with studies on the problem of the removal of fluoride from drinking waters, it was found that the fluoride can be removed by treatment with magnesium oxide in a manner which gives promise of economical development. In addition to the fact that the magnesium oxide used (calcined magnesite) is a comparatively cheap chemical and commercially available in large quantities, it has been pointed out also in a recent publication (Engineering News-Record, vol. 120, pp. 591-593, 1938) that even a cheaper source of magnesium oxide might be made available, within the water works industry itself, by applying what has been termed the "two-way application of lime" in lime-soda water softening. This procedure would permit the utilization of the lime sludge for producing the lime needed in the water softening and thus also solve the problem of the disposal of the lime sludge. The magnesium remaining in the water could then be precipitated separately and utilized for fluoride removal. In other words, municipalities with magnesium-containing waters having water softening problems and municipalities having the problem of fluoride removal could cooperate to mutual advantage.

Analytical work.—There were carried out about 254 various analyses of miscellaneous material; 4 examinations of urine for lead; 47 chemical examinations of water; 50 analyses of arsphenamines and neoarsphenamines; several toxicological examinations of miscellaneous material; and 188 microdeterminations in connection with the sugar researches.

Nutrition investigations.—During the fiscal year the studies on the effect of light and temperature on the accumulation of ascorbic acid in plants were continued preliminary to a further study on the effect of the supply of inorganic material. These experiments have shown that light has a striking effect on the accumulation of ascorbic acid in the roots, as well as in the leaves, of plants. Plants grown in both light and darkness at various temperatures accumulated ascorbic acid more rapidly at the higher temperatures. At the close of the fiscal year preliminary experiments are in progress with different levels of calcium to observe the effect upon ascorbic acid accumulation in the plant.

The studies on riboflavin deficiency in dogs in progress at the close of the preceding fiscal year were completed and it was shown that a diet deficient in riboflavin (vitamin G) produces a hitherto undescribed pathological syndrome characterized by sudden collapse and death accompanied by bradycardia and in most instances a severe, fatty infiltration of the liver.

A series of experiments was carried out in order to determine the minimum dose of nicotinic acid which would prevent blacktongue. The results indicate that a semiweekly dose of 3 mg of nicotinic acid is barely sufficient to prevent the onset of the disease.

Experiments with preparations containing the chick filtrate factor were continued and further evidence was obtained that the chick filtrate factor is not the blacktongue preventive vitamin.

In an effort to determine the possible mode of action of nicotinic acid in curing blacktongue, an experiment was carried out which demonstrated that Warburg's cozymase was ineffective.

Further experiments on the effect of small quantities of cystine amine on young rats demonstrated the occurrence of very extensive unexplained bone changes. It is expected that further work will be done to determine the cause of this condition.

At the close of the fiscal year experiments on the effect of a low protein diet and of various concentrates of the vitamin B complex on rats are in progress.

In collaboration with the Division of Infectious Diseases an experiment on the buccal and gastro-intestinal lesions in monkeys produced by vitamins A, C, D, and B complex deficient diets was in progress.

An effort is also being made to develop a method for the determination of nicotinic acid in urine and supervision over the mineral analysis of certain Alabama and Tennessee foods is being maintained.

Toward the close of the fiscal year the Milledgeville Station was reopened and a large scale experiment on the effect of nicotinic acid on the prevention of pellagra was started.

The nutritionists in eleven State health departments were visited for the purpose of observing the development of their activities and assisting with the programs.

DIVISION OF INDUSTRIAL HYGIENE

Senior Surg. R. R. SAYERS in charge

The Division has as its objective the development of means for the protection and improvement of the health of the working population. Its activities include field investigations, laboratory research, and services.

Dust studies.—*Pottery*: A bulletin has been prepared on the results of a medical study of 2,516 potters and an engineering and chemical study of the nine factories in which they were employed. Nineteen years have elapsed since an earlier study of this industry was made (Public Health Bulletin No. 116); lead poisoning is now no longer a problem. Silicosis is a hazard for workers exposed to dust concentrations in excess of 4 million particles per cubic foot. More than three-fourths of the clay shop workers employed for more than 30 years were found to have silicosis. *Granite*: A reexamination of about 200 men employed in the granite cutting industry was made to

determine the progress of silicosis under controlled and uncontrolled working environments. Analyses in progress include the comparison of the results of these examinations with those made 10 years previously (Public Health Bulletin No. 187). *Asbestos*: The bulletin reporting the results of a study of asbestosis in the asbestos textile industry is in press. *Pathology*: Nineteen samples of dust were tested biologically to determine their pneumoconiosis-producing potentialities. Further correlation of the biological behavior of dusts in the peritoneum of guinea pigs with human post mortem material from cases of pneumoconiosis indicated that dusts producing an inert reaction in the peritoneum cause a pneumoconiosis of the diffuse fibrous type, whereas those producing a proliferative reaction cause a nodular type of fibrosis. Mixtures of the two dusts produce a combined type in which the lesions are both nodular and diffuse. Dusts of the absorptive group have not been found to produce pneumoconiosis. Fifty specimens of human pathological material have been collected for the laboratory. Of these, 47 are from cases of pneumoconiosis, one from benzol and one from methanol poisoning, and one from chlorinated hydrocarbon dermatitis.

Spray insecticides.—Work was begun on a study of the health of workers using spray insecticides in certain apple-growing districts. Estimations are being made of the concentrations of spray insecticides to which these individuals are exposed. A study on the absorption and excretion of lead arsenate is in press. In this inquiry 100 mg of lead arsenate were ingested by two individuals over a period of 10 days while on a control diet. The degree of absorption, path of excretion, and toxicity of this dosage were evaluated. Variations of the calcium content of the diet and the effect of changes in the hydrogen ion concentration as induced by ammonium chloride were noted. While lead arsenate was completely broken down in the body, no untoward effects on the well-being of these two individuals attributable to this quantity were noted. The greater part of the lead and arsenic derived from the ingested lead arsenate was directly recovered and it was found that the lead was excreted with the feces and the arsenic was found in the urine. A study of the relative toxicity of lead and its compounds is approaching completion. Animal experiments having for their objective the determination of the toxicity of lead arsenate with reference both to the entire molecule and to the molecular constituents have been in progress for 10 months, and show thus far an apparently greater toxicity due to soluble arsenate than to either lead alone or lead arsenate itself. A study on the solubility of lead in various biological fluids showed that in most of these media soluble arsenates are found under equilibrium conditions. A study of the lead content of normal blood is in progress. A total of 3,259 samples of blood, urine, feces, impinger, and dust samples was received for analysis. Arsenic, lead, and hydrogen ion concentration measurements to the extent of 2,194 have been made, while 2,192 additional analyses are partly completed. Two methods for the determination of lead in biological material were studied. The photometric chromate method was developed and the dithizone method was refined by chemical simplification and the introduction of mechanical aids. Investigations of the acute toxicity of various arsenic compounds have been made. Furthermore, the

local and general physiological and histological changes produced by various dosages and concentrations of these compounds have been studied. Mice, rats, and guinea pigs have been used as experimental animals. It was found that these compounds increase intestinal motility, intestinal tonus, and fluid excretion from the intestine.

Heavy metals.—*Lead*: A medical study was made on about 800 workers engaged in the manufacture of lead storage batteries. Engineering studies of the workers' environment were completed in 10 plants. These reports are being analyzed for publication. The completed survey covers 25 percent of the lead storage battery industry on the basis of the number of employees. *Mercury*: About 600 men employed in nine felt hat factories were examined medically. Their working environment was studied from an engineering and from a chemical standpoint. During the coming fiscal year these data will be correlated with the medical findings and the results prepared for publication. A new method for the determination of mercury in fur dust was developed. *Manganese*: Eleven cases of chronic manganese poisoning were found on medical examination of 34 men employed in a manganese ore-crushing mill in which the manganese content of the air averaged as much as 173 mg per cu m. The disease is characterized by loss of muscular coordination which results in disability, associated with lesions in the basal ganglia. Methods for preventing dust dispersal and thus preventing the occurrence of new cases of the disease were tested; these methods appear to be satisfactory.

Organic compounds.—*Chlorinated diphenyls*: Guinea pigs, rabbits, and rats were exposed by different methods to a series of commercial chlorinated diphenyls containing from 19 to 65 percent chlorine. Commercial chlorinated diphenyls containing 48 to 54 percent chlorine were found to be the most toxic for the experimental animals. The principal pathological changes occurred in the liver. *Phenyldichlorarsine*: Mixtures of petroleum distillates containing about 1 percent by weight phenyldichlorarsine have been suggested as wood preservatives. Oil mixtures containing phenyldichlorarsine have been applied to men to determine toxicity. The reactions resulting from skin contact with these mixtures varied with the individual. Some persons showed no reaction, and in others a marked initial vesiculation resulted. In two cases a delayed action occurred. *Toxicity of ketones*: A study of the toxicity of a series of ketones upon inhalation of the vapor was conducted throughout the year. Ketones already investigated are: Acetone, butanone, pentanone -2, hexanone -2, hexone, acetyl acetone, mesityl oxide, heptanone -2, and octanone -2. The presence or absence of the following symptoms was recorded with respect to vapor concentration and duration of exposure: State of activity, weakness, coma, irritation of eyes, nose, and mouth, central nervous system release phenomena, auditory reflex, corneal reflex, righting reflex, pillar reflex, and death. An extended quantitative study was made of rectal temperature, respiratory rate, and pulse. Analysis of the ketones for physical properties was made. The concentration of the vapor was followed by a chemical analysis at intervals during the exposure. *Methyl bromide*: Laboratory and field studies were performed on the toxicity of methyl bromide, with a view to developing methods of use which will ade-

quately protect the users of gas, and the handlers and consumers of fumigated products. Preliminary recommendations to fumigators using methyl bromide or mixtures containing methyl bromide as a fumigant have been made and are now being generally followed.

Other studies.—*Selenium*: Exposure for 4 hours to hydrogen selenide, at a concentration of 0.015 milligram per liter, is fatal to guinea pigs. The pathology exhibited is primarily early severe fatty metamorphosis of the liver, with later hypertrophy of the spleen. *Fatigue*: Preparations have been made for a study of the physiological and psychological state in relation to hours of driving with respect to bus and truck drivers engaged in interstate transportation. The purpose is to make a systematic study of methods of testing fatigue of various physiological and psychological functions; under controlled conditions to make a preliminary study of truck drivers using visual, physiological, and psychological methods of assaying fatigue; and to obtain data with respect to the relationship of hours of work in driving and the fatigue status of drivers of trucks and busses.

Physical method.—*Illumination*: Measurement of illumination in the field in the localities of high and low tuberculosis incidence has been continued throughout the year. It is found that in the northern region where there is greater tuberculosis incidence, there is decidedly less radiation during the winter months, amounting to a maximum difference of 85 percent as compared with southern regions, whereas during the summer months there is virtual equality of illumination. During the past 2½ months continuous records of integrated ultraviolet radiation have been obtained at two stations. In addition, the time variation of ultraviolet intensity has been determined on typical clear and cloudy days. *Spectroscopy*: In the course of the year, the methods being used for spectroscopic analysis have undergone marked improvement, made possible by rearrangement of facilities, development of a special room for densitometry, improvement of the equipment for densitometry, and the development of new methods of analysis of the densitometer data. Quantitative spectroscopic analysis by sensitive line detection has been carried out on over 750 urine samples in the course of the investigation of lead toxicity in the storage battery industry. *Spectrophotometry*: Investigation of carbon monoxide hemoglobin by spectrophotometer with special reference to the interference of scattering through the use of a specially constructed colorimeter has shown that whereas scattering interferes with accurate determination, particularly of low carbon monoxide concentrations, by measurement of absolute magnitude of spectral absorption it is found that ratios obtained by comparison of wave lengths of high and low absorption are reasonably free from this error. The application of the ratio method utilizing wave lengths obtainable for the mercury arc have been tested in the portable colorimeter and found to furnish an excellent basis for evaluation of carbon monoxide hemoglobin. A new portable differential colorimeter, suitable for use where stable current supply is now available, has been designed. This equipment and method will be employed during the coming study of the fatigue of bus and truck drivers. *Hydrogen ion concentration*: During the latter part of the year, a precision pH apparatus has been assembled, tested, and standardized; measurements have been carried out in connection with radi-

ation studies on bacteria and fungi. *Air contaminants:* Preliminary investigation has been carried out on ventilation and precipitation methods of air sterilization. The accomplishment of these preliminary studies has required, during the year, the development of special equipment for producing and measuring monochromatic ultraviolet radiation for the efficient handling under aseptic conditions of bacteria, yeast, and fungi. Furthermore, in preparation for the study under practical conditions of air-borne organisms at a wide range of temperature and humidity, a special air-conditioned chamber has been built.

Studies of sickness among industrial workers.—Incidence of disabling illness: The analysis of monthly reports from a group of 30 industrial sick benefit organizations providing sickness insurance for about 170,000 male industrial employees was continued during the year and published quarterly. Special studies have been submitted for publication, and others are in preparation. *Occupational morbidity and mortality study:* This study was continued. A paper on the general aspects and functions of the sick benefit organizations supplying the data was published. A bulletin (Pub. Health Bull. No. 238) presenting an occupational and environmental analysis of the cement, clay, and pottery industries has appeared. A report on the frequency of sickness and nonindustrial accidents causing disability lasting 8 calendar days or longer among 60,000 white male railroad employees was published, and showed, among other things, that on the average 3.7 percent of the employees were disabled every day, and that the annual number of days of disability per employee was 13.6. The tabulations for 20 industries, representing about 20 percent of the 500,000 workers with records covering 5 years, were completed. The reports on three industries are being prepared for publication.

Studies on the age of gainful workers.—The fourth and fifth papers of this series have appeared.

Dermatoses investigations.—An investigation of five outbreaks of occupational dermatoses was made in different sections of the United States. The causes were discovered and recommendations were made for the prevention of recurrences. The manufacturing processes and skin hazards connected therewith were studied in 15 factories, employing a total of 13,000 workers, of which number about 4,000 were inspected for the occurrence of skin diseases. Five papers were published.

Consultation services to the States.—In order that the principles of prevention developed in the field of industrial hygiene may be made available to the industrial workers, proper recognition of this activity should be given by States through the establishment of industrial hygiene units in State and local departments of health. The Division has always fostered such development, and for the past 3 years has actively aided various States in the creation of industrial hygiene programs. The assistance given the various health departments in the development of industrial hygiene programs included the organization of industrial hygiene divisions and the initiation of studies for the purpose of defining the nature and scope of the problem. Twelve States are at present actively engaged in such surveys and at the close of the calendar year sample

data will be available from 18 States, embracing a population of 18 million gainful workers. An analysis of these data by this Division will throw light on the magnitude and importance of the industrial hygiene problem in this country. Technical aid to the States was rendered in the evaluation and control of health hazards in industry and, on certain occasions, personnel from this Division conducted studies in selected industries in cooperation with State and local personnel. Lectures on the subject of industrial hygiene were delivered at two universities designated by the Public Health Service as training centers for public health personnel. In connection with the training of personnel, brief courses were conducted in seven States, while individual instruction of a practical nature was also given. This Division cooperated with the first National Conference of Governmental Industrial Hygienists, which was held in Washington and at which approximately 50 persons were present from 23 States, 2 universities, and the Dominion of Canada. At this conference the major industrial hygiene problems were given consideration and committees appointed to study these problems and to render reports next year. In the development of industrial hygiene during the past year a decided advance was made as to the definition of the problem in the various States and the services rendered by them to industry, labor, and other agencies. Furthermore, there was a trend toward an integration of effort between the industrial hygiene units and other divisions in State and local health departments concerning the improvement of health among the workers. At present there are active industrial hygiene units in 26 States, while 6 other States are conducting studies for the purpose of determining their needs with reference to such work. Of a total of approximately 49 million gainful workers in the United States, 38 million are now in a position to receive services in industrial hygiene. The total personnel in the 26 States furnishing industrial hygiene services is 163, of which 124 are professional workers. The entire budget for this activity in these States is now approximately \$600,000.

DIVISION OF INFECTIOUS DISEASES

Senior Surg. R. E. DYER in charge

Rickettsial diseases.—Studies were continued at the National Institute of Health and at the Mobile, Ala., field laboratory on the two rickettsial diseases present in the eastern and southern sections of the United States—endemic typhus and Rocky Mountain spotted fever.

In the typhus studies work was directed to determine the causes of the definite increase in the disease during the past decade, and the development of methods for a better control. The increase in typhus fever has been particularly noted in Georgia, Alabama, and Texas.

Animals indigenous to the sections where typhus is prevalent were studied to determine their ability to act as reservoirs of the disease in nature and to determine how long a number of different common species might continue to harbor the virus. Eleven species of native rodents have been found capable of harboring the virus. The period during which the virus may be recovered from various species covers

as long as 5 months. From experiments now in progress it seems that this period may extend still longer in certain native rodents.

At the close of the year a strain of typhus was isolated from a species of rodent hitherto not known to be infected in this country (*Mus alexandrinus*). The infected rats were trapped on a farm in southern Alabama.

In cooperation with State and local health departments and practicing physicians, studies of typical and atypical cases of typhus have been carried out to determine better methods of diagnosis in the laboratory.

The area known to be infected with Rocky Mountain spotted fever expanded during the year with the recognition of the disease in Massachusetts and Ohio, neither of which had previously reported cases.

Strains of spotted fever isolated from cases in the Eastern States during the past year, and studied in laboratory animals, have been found to vary, particularly in virulence, from strains originally studied from the same sections.

Cultivation of the rickettsiae of Rocky Mountain spotted fever in modified Maitland media was continued, and experiments carried out on guinea pigs and monkeys to determine the immunizing properties of such cultures after treatment with formalin. Guinea pigs given two inoculations of vaccine were completely protected against the disease, and over 50 percent were protected after one inoculation of 1 cc of vaccine. The results obtained in monkeys were favorable, only 1 monkey, out of 12 treated with vaccines, developing typical symptoms of the disease after inoculation with infected blood. Comparative tests using the tissue vaccine and the tick vaccine were made on monkeys and somewhat better results were obtained with the tissue vaccine than with the tick vaccine. Protective antibodies were demonstrated in the serums of immunized monkeys, approximately 75 percent of the guinea pigs used in these tests being protected against infected blood.

Methods for obtaining growth of the rickettsiae on a larger scale have been studied. Sheep serum in place of guinea pig serum, and tissues other than guinea pig, including guinea pig heart and kidney and mouse embryo, have twice been found to yield rather favorable results.

Lymphocytic choriomeningitis.—Studies on the occurrence of neutralizing antibodies in human sera from various sources have been continued with findings of a surprisingly high percentage of positive sera from certain localities. Studies on the influence of various vitamins and chemicals upon susceptibility of mice to infection with the virus have been carried out without significant positive findings to date. Customary methods of freezing and drying of virus with a view to preservation have been applied successfully to this virus. The preparation of vaccine is being investigated with encouraging results.

The virus of lymphocytic choriomeningitis was cultivated without loss of virulence through a series of 27 passages in Maitland medium, prepared with rabbit serum and mouse embryo. The virus is resistant to a rather acid medium and is less affected by apparently unfavorable conditions than are the rickettsiae of Rocky Mountain spotted fever. No difficulties were encountered in maintaining the

virus in a viable condition during the course of the experiment. Transfers were made at intervals of 3 to 4 days, but longer periods between transfers were also favorable as the virus was still viable after 3 weeks' storage at 37.6° C.

Encephalitis (St. Louis type).—Studies carried out indicate that the central nervous system lesions in mice are less marked in warm weather than in cold. Studies on susceptibility of mice to intranasal inoculation of the virus indicate that a preliminary course of intranasal instillations with cultures or culture filtration of organisms from the nasal washings of normal mice notably increases the temporary resistance of groups of mice to subsequent intranasal inoculation with the virus.

Poliomyelitis.—A considerable number of animal species have been tested for susceptibility to infection with this virus without any definitely positive findings.

Hemolytic streptococcus diseases.—The epidemiological study of active immunization against scarlet fever has been continued. The group now includes more than 11,500 children. The Dick positive children are being immunized with purified and tannic acid precipitated scarlet fever toxin. Approximately 85 percent become negative after three injections. To date, the attack rate among the treated children is 10 times less than in the corresponding control group.

An improved method of preparing scarlet fever toxin of high potency has been perfected which is particularly advantageous in preparing the purified and tannic acid precipitated toxin.

A study has been completed relating to the specificity of the hemolytic streptococcus in relation to the clinical diseases involved.

The problem of improving the stability of the Dick test toxin has been investigated. A technique has been found which adds considerably to the life of the toxin.

Studies were continued on the classification of hemolytic streptococci and a new approach to the problem concerned the correlation between serological grouping and sensitivity to bacteriophage. A description of *S. scarlatinae* was published during the year.

Relapsing fever.—Of 119 naturally infected *Ornithodoros turicata* ticks collected in caves in Texas in 1931, 16 are still living at the end of 7 years and virulent relapsing fever spirochetes were demonstrated in them at the end of 6½ years.

Tularaemia.—This disease was reported by the State health officers of 37 States and the District of Columbia, a total of 960 cases being reported in 1937 as compared with 903 cases in 1936. Turkey recognized the disease for the first time in 1936 and reported 112 cases.

It was found that spleens of guinea pigs dead of tularaemia in 1925 and preserved in undiluted glycerin at -15° C. possessed maximum virulence in 1938 after 13 years' storage.

Brucellosis.—As the result of a survey, 28 chronic cases have been found in a southeastern city of approximately 92,000 inhabitants. Other probable cases in that city could not be diagnosed definitely because reliable tests are lacking. The data collected by field investigators have been analyzed in an attempt to evaluate the several laboratory tests which are used for the diagnosis of this disease.

Pertussis.—Laboratory studies have been made on whooping cough with a view to improving methods of prevention. A method of pro-

ducing antigen in quantities has been worked out and its value as an immunizing and diagnostic agent is being studied.

Dental investigations.—With the basic facts of the epidemiology of chronic endemic dental fluorosis (mottled enamel) definitely established, the study was partially shifted during the year to an investigation of the most important byproduct of the mottled enamel study, namely, the limited immunity to dental caries of children residing in endemic areas. Two studies on this relationship were undertaken. The first, a comparative study with the School of Dentistry, University of Michigan, was made at Amarillo and Wichita Falls, Tex. In the second study, a survey to establish the distribution of mottled enamel in South Dakota provided sufficient data to permit a comparison of mottled enamel prevalence with the severity of dental caries as reported in Public Health Bulletin No. 226. In the populations studied, the severity of dental caries was inversely proportional to the prevalence of mottled enamel. Similar differences were noted in a like study of four Colorado and eight Wisconsin cities. As the mineral composition of a domestic water apparently has an important bearing on the incidence of dental caries in a community, the possibility of partially controlling dental caries through domestic water supply warrants thorough epidemiological-chemical study.

A resurvey was made of Bauxite, Ark., 10 years after a change in the common water supply from a deep well supply containing about 13.0 p. p. m. of fluorides (F) to a filtered river supply free of toxic amounts of fluorides. The change in the common water supply definitely halted the production of mottled enamel.

Pseudotuberculosis rodentium.—During the course of routine identification of cultures sent to the institute, a culture of *B. pseudotuberculosis rodentium* was encountered. The organism was originally isolated from the liver of a fatal human case of an unexplained fever occurring in the western United States.

Vincent's infections.—Investigations are in progress to determine the possible relationship between certain types of stomatitis, particularly Vincent's disease, and selected dietary deficiencies.

Bacillary dysentery.—The possible relationship of dietary deficiencies to bacillary dysentery is being studied.

Weil's disease.—Hitherto considered a tropical disease, Weil's disease has been found endemic in the United States, causing disability and at times death. Clear-cut cases were diagnosed in New York, Michigan, Pennsylvania, South Carolina, West Virginia, Iowa, Texas, and Florida. Epidemiological studies were conducted in Michigan, New York, and Pennsylvania. It was found that dogs may acquire infection from rats and contaminated water and soil. *Leptospira* were found in samples of mud in Detroit, Mich., and Windber, Pa. It was found that American deer mice, genus *Peromyscus*, are extremely susceptible to the spirochete of Weil's disease, thus opening the way for early laboratory diagnosis. The microscopical agglutination test was improved and new types of *Leptospira icterohemorrhagiae* were recovered. This information was made available to physicians by publication.

Chagas' disease.—A field study was conducted in Texas. A number of *Triatoma sanguisuga* (kissing bugs, blood suckers) were collected

and demonstrated to be carriers of *Trypanosoma cruzi*. Immunological studies covered agglutination reactions for diagnosing the disease in experimental animals and in man. Aid was given to Mexican, Argentinian and Brazilian workers.

Diphtheria studies.—Studies have been commenced which have as their long-term objective an effort to understand some of the factors involved in the peculiar regional distribution of diphtheria in the United States. The work is directed toward a possible explanation of the high immunity level of the population of certain southern areas where immunity, as measured by the Schick test, does not appear to be a function of aggregation of population.

Medical mycology.—During the past year studies of strains of *Actinomyces* isolated from tonsils were continued. Attempts to produce progressive clinical actinomycosis in guinea pigs inoculated with pure cultures were not successful, nor were the experimental animals sensitized to actinomycetin or tuberculin. In these respects, and in cultural and morphological characteristics, these strains of *Actinomyces* resemble the pathogenic species, *A. bovis*, with which species, it is believed, they are identical. These studies present additional evidence that the etiologic agent of actinomycosis is normally in the oral cavity. It is improbable that it is introduced from the environment on straws, and the like, as stated in many text books.

A survey to determine the species of fungi causing dermatophytosis of the scalp in San Antonio, Tex., has been carried out in cooperation with local physicians. An unusual variety of species of dermatophytes, some of which are rare or absent in Washington, D. C., were isolated in pure culture. From 62 specimens *Trichophyton epilans* was isolated 16 times, *T. violaceum* once, *Microsporum canis* 29 times, *Microsporum gypseum* once, and *Microsporum* sp. once. From other types of dermatophytosis *Trichophyton purpureum* was isolated six times.

A survey to determine the species of fungi causing dermatophytosis of the scalp in Negro children in Washington, D. C., to study fluorescence of cultures under filtered ultraviolet light as a means of determining species, and to look for strains with characters intermediate between the two common species of *Microsporum* was undertaken. From 76 specimens, *Microsporum audouini* was obtained in pure culture 41 times, *M. canis* 13 times, and *M. gypseum* once. This survey is not yet completed.

In cooperation with the Section of Nutrition, assays of vitamin B₁ in blood and urine of experimental animals have been made, using *Phycomyces blakesleeanus* and other fungi requiring B₁ for growth.

The effect of monochromatic ultraviolet light upon spores of the dermatophytes has been studied. Killing curves have been determined and the influence of irradiation upon rate of mutation is being investigated.

Researches on the staphylococcus.—The quantitative relationships in the reaction between staphylococcus toxin and rabbit red blood cells follows the Freundlich isothermic generalization. The relationships change with the temperature of incubation and with the total volume of the liquid. The assumption is therefore made that the immediate reaction-step between staphylococcus toxin and red blood cells is of the nature of adsorption.

The quantitative relationships in the reaction between the staphylococcus toxin and antitoxin, as indicated by the neutralization of alpha toxin, has invariably expressed itself in the form of a straight line equation of the same order regardless of the temperature of incubation and the total volume of liquid. The assumption is therefore made that the law of molecular equivalents prevails in this reaction, as was originally advanced by Ehrlich.

Evidence has been obtained from experimentation *in vivo* and *in vitro* indicating that the hemolytic, dermonecrotic, and acute killing functions of staphylococcus toxin and the corresponding neutralizing functions of the antitoxin are only manifestations of one and the same cell-destroying property of the toxin and its specific antibody in the antitoxin.

In experimental staphylococcemia mucin increased the susceptibility of the experimental mice to only a slight degree. Where the dosage and the animal susceptibility were favorable, death occurred within 48 hours, due to a high degree of invasiveness of toxemia. Contamination of the mucin-suspended inoculum with bacteria culturally simulating *Eberthella enterica*, *Salmonella icteroides*, and *Salmonella abortive equina* proved most fatal to the mucin-injected white mice. Such contamination constitutes a factor scrupulously to be guarded against in mucin-produced experimental staphylococcemia.

Chemical and biological processes.—Studies of adsorption in biological systems ("bioadsorption") were directed mainly towards the identification and isolation of adsorbents from zoogeleal growths. Similar compounds were then prepared in the laboratory for *in vitro* experimentation. *Acetobacter* and *Azotobacter* have been used, respectively, as models for pathogens such as the tubercle bacillus and the pneumococcus.

In the case of *Acetobacter*, it has been demonstrated with reasonable certainty that the adsorbent is a silica gel capable of removing alcohol and related compounds (glycerol, etc.) from solution. These experiments, therefore, have offered a possible explanation for the stimulating effect of free silica (quartz, etc.) on the growth of the tubercle bacillus in silicotic tissues. On the other hand, it can readily be shown that the adsorbent properties of *compounds* of silica, such as alumino-, ferro-, and mangano-silicates differ markedly from those of silica or the silica gels. These more complex compounds of silica, nevertheless, may function as adsorbents in other biological systems (for example, in the adsorption of ammonia by the nitrifying bacteria or iron and manganese by other classes of bacteria). The theory implied in these experiments offers a plausible explanation for the different effects of siliceous dusts on lung tissue. The rationale of various preventive measures or treatments of tuberculosis with ferric chloride, alumina powder, or other so-called indifferent dusts would appear to be a modification of the adsorbent system.

Other implications of this bioadsorption theory are under investigation.

Immunology.—Three distinct lines of study were pursued as follows: 1. Blood coagulation: New methods were developed for the study of clotting phenomena. These lead to new concepts about intrinsic occurrences, a new method for the determination of clotting time in both normal and diseased blood, better understanding of the

correlation between food and clotting time, a new method for the determination of calcium content of organic and inorganic compounds, findings pertaining to high clotting power of milk, findings pertaining to different plant extracts, chiefly extracts of tobacco, and the development of a new coagulant active *in vitro* and in experimental animals and of possible use in patients.

2. Pure immunology: Many experiments were conducted in order to follow the destiny of antigens introduced into the organism of experimental animals. These experiments led to the following conclusions: It was shown that under the influence of the live blood, the antigens undergo a splitting process leading to small molecular dialyzable but still antigenically active products. Evidence was gained for the hypothesis that these split products become anchored by all the tissues, and can be demonstrated in them by the use of antisera. The conception of the "antigenic" phase of infectious diseases was gained and developed through experiments made with endemic typhus on guinea pigs. The same conception of "antigenic" phase was borne out in experiments on trichinosis made jointly with the Division of Zoology. A hitherto unknown function of the different organs of the infected animals was encountered, that of producing antigenically variants different from the infective strain.

3. Studies on malaria: These were undertaken in order to correlate newer immunological conceptions with this protozoan disease presenting so many controversial serological features.

Precipitin reactions were studied, mainly in order to clarify the questions of the so-called doubtful or $\pm$ reactions, and some of these questions were apparently solved. Among other serological reactions, approach was gained for the diagnostic utilization of agglutination reactions. A method was recently developed for the concentration and purification of malaria parasites with the aid of hemolytic factors, mainly saponin.

HEART DISEASE INVESTIGATIONS

1. *Clinical and laboratory studies.*—In contrast to last year there was an abundance of clinical material available. More than 100 cases of rheumatic carditis were studied. Severity in general was high, and there were 16 deaths in this group.

Search for intrinsic predisposing causes of rheumatic fever: It is suspected that these may be found in some altered conditions of physiology and metabolism. Studies of blood glutathione, blood catalase, and glucose tolerance revealed no characteristic alterations. However, preliminary analysis of blood acetyl choline esterase determinations indicate a constant inverse ratio to disease activity, which is considered a promising lead. The formol gel serum reaction, though nonspecific, was found to be a good index of activity of the disease, persisting longer than high sedimentation rates.

Animal experimentation: Supplementary to the clinical studies, attempts were made to induce cardiac lesions in animals by introducing metabolic factors. A study of the scurvy-infection heart lesions of guinea pigs indicated that increased metabolic rates (induced by irradiation and by insulin) are factors in their production.

Induced acidosis and adrenal insufficiency in rats did not cause heart lesions. Neither was vitamin B₁ deficiency effective in guinea pigs.

Studies were made of the sensitizing and desensitizing effect of streptococci and their toxic serum extracts administered by different routes to rabbits. These have a bearing on the streptococcal theory of etiology.

2. *Epidemiological studies.*—The country-wide questionnaire on prevalence of rheumatic heart disease was continued.

Studies of mortality from rheumatic heart disease centered in Philadelphia. Deaths from this disease are frequently not so reported and recorded. A special effort to secure specific reporting resulted in figures indicating a mortality of 17.6 per 100,000 for the year 1936. Interpretation of additional nonspecific death certificates increased the figure to 25 to 30. Rheumatic heart disease was exceeded as a cause of death only by tuberculosis, pneumonia, and syphilis, while among persons under 20 it caused more deaths than whooping cough, measles, meningococcus meningitis, diphtheria, scarlet fever, and poliomyelitis combined.

Recording and reporting deaths from rheumatic heart disease continued. In order to improve present conditions, a plan was devised in cooperation with the Office of Vital Statistics, Bureau of the Census, whereby it may be tabulated as a disease entity in the United States. A committee of the American Public Health Association has approved the plan which will be presented for adoption at the next meeting of the Decennial Commission for the Revision of the International List of Causes of Death.

Familial and environmental aspects of rheumatic heart disease were given special attention. Multiple cases of this disease were found in about 40 percent of the families of children suffering from it and encountered at clinics, confirming last year's estimate. Deaths from this disease occurred predominantly but not exclusively in families on relief or with incomes of less than \$2,000.

Observations on rheumatic heart disease in college students brought out some interesting data. A questionnaire answered by 86 colleges indicated an incidence of 11.6 per 1000. Evidence was found for the belief that the more experienced examiners made this diagnosis less frequently.

Where medical schools were affiliated with the colleges, the incidence was only 6.4 per 1,000, which is believed to approximate the true incidence in college students.

LEPROSY INVESTIGATIONS

Prevalence and spread of leprosy in continental United States.—These studies have been devoted to collecting data from the localities in which leprosy appears to be communicable to an extent sufficient to merit consideration from the public health point of view, and from areas in which the disease does not spread sufficiently to make it a public health problem.

While the data are not complete it may be said, in general, that only in some parts of certain of the States bordering on the Gulf of Mexico does the disease show any notable tendency to spread, and even in individual States there are striking limitations of areas of

communicability. For example, in Florida nearly all the cases come from two foci, one located in about the middle of the State on the west coast, and the other in the extreme south; there is, however, a third very small focus on the east coast which, until very recently, had been confined to three members of one family group. Recently a resident of the community outside the family circle referred to has shown signs of infection.

Through the generous cooperation of the Minnesota State Department of Health accurate information has been secured with respect to the long-recognized focus of leprosy in that State, a focus which in the past has been studied more intensively by Scandinavian authorities on leprosy than by any individual or agency in the United States interested in the subject. It appears that a considerable number of lepers (probably about 150), either in the incubation period or already showing active manifestations, came to Minnesota, and a smaller number to Iowa and Wisconsin, in the latter half of the past century and the early part of the present century.

Only seven definite cases and one doubtful case developed from this introduction of the disease; these were chiefly among members of families in which the infection was brought from abroad. In other words, in that part of the country the disease extinguished itself in two generations.

Investigations in New York, Philadelphia, and Chicago have shown that while in the past a fair number of cases have been detected and cases continue to be detected in these communities, with but a single exception all are traceable to infection elsewhere, usually in well-known foci of the disease.

The facts thus far developed in the study should be taken into consideration in formulating any rational program for the control of the disease in continental United States. Thus it would seem that health authorities might properly discriminate in measures to be taken as between cases coming under observation in regions in which the disease is known to spread and cases domiciled in regions where experience has shown that the disease does not tend to spread or spreads only very feebly.

Leprosy in Hawaii.—During the past year the activities of the Leprosy Investigation Station, Honolulu, have comprised investigations into various phases of leprosy and the care and treatment of the patients in the adjoining Territorial Leprosy Receiving Hospital. The following are some of the studies conducted.

(1) Continuation of studies of the relation of nutrition to rat leprosy has shown that animals poorly nourished, either by deficiency in some of the vitamins or through general starvation, are more susceptible to rat leprosy than are well-nourished animals. It also has been learned that animals deficient in one of the essential minerals are more susceptible than were the other malnourished animals studied.

(2) Attempts to cultivate the causative agents of human and rat leprosy have, as usual, met with failure. However, on one type of culture media the causative agent of one strain of rat leprosy has remained alive, as proved by animal inoculation, for 78 days at 37° C. At no time during this period was there noted any macroscopic evidence of colony formation.

(3) Investigations were made of acid-fast organisms isolated from human cases of leprosy. Three acid-fast bacteria isolated from human cases at this station and one isolated from a human case in South America received through the courtesy of the investigator by whom it was isolated, have been studied. These organisms differ in the rapidity and ability with which they grow on laboratory material and in their cultural characteristics. When inoculated into animals they produce similar reactions, all appearing to be nonpathogenic.

The results obtained with the sera of human cases of leprosy, using these organisms as antigens in complement-fixation tests, are remarkably similar. Those obtained with the South American organism agree with those obtained with the three strains isolated locally in 90.5, 91.6, and 97.4 percent of the tests, and with those obtained with a strain of human tubercle bacillus and a strain of timothy bacillus in 90.5 and 100.0 percent.

Cross agglutination occurs when the sera of rabbits inoculated with these organisms are tested for the presence of agglutinins. Agglutinin absorption has shown that these organisms produce in the sera of inoculated rabbits heterologous as well as homologous agglutinins.

The results of intradermal tests performed on 110 patients with products prepared from two of these organisms agree in approximately 80 percent of the cases, and in approximately the same percent with those obtained with the tuberculin test.

These studies suggest that the results obtained with complement fixation, agglutination, and intradermal tests are due to a group phenomena and will prove of little diagnostic value.

(4) Investigations of different strains of rat leprosy were continued. Following inoculation with equal amounts of infective material, there has been noted a definite difference in the virulence of the three strains of rat leprosy as shown by the time of appearance of gross lesions and the extent of involvement of the organs of the inoculated animal. Microscopic examination of tissue specimens likewise gave histological evidence of variation in virulence.

(5) A systematic investigation of the histopathology and pathogenesis of rat and human leprosy in experimental animals was made.

(6) Investigations were made of methods of staining acid-fast bacilli in sections. It is believed that this study has resulted in the development of a more satisfactory method of staining acid-fast organisms in tissue preparations.

(7) The treatment of acute leprous neuritis in human cases of leprosy was studied. Oral administration of vitamin B₁ concentrate appears to have little or no effect on the progress of acute leprous neuritis. Intramuscular injections of a vitamin B₁ concentrate in a small series of cases appeared definitely to have influenced the course of the neuritis by prompt relief of pain and rapid subsidence of enlargement and tenderness.

(8) Corrections were continued of deformities in human cases of leprosy. By the development and employment of orthopedic devices, it has been found possible to correct deformities due to nerve involvement in a greater number of cases than previously. In some instances deformities of rather long duration have been corrected by these methods. Such treatment is of definite value to that type of patient in whom the disease has become arrested and who is released from segregation.

ROCKY MOUNTAIN LABORATORY

Rocky Mountain spotted fever.—The gross amount of preventive vaccine prepared was 592.4 liters; the amount distributed was 362.9 liters, 71 more than in 1937. Over one-third the amount distributed was for the immunization of field personnel representing 21 Federal services. The Civilian Conservation Corps used 92.9 liters.

Case reports have been received for the first time from 11 new counties in the States of Iowa, Oklahoma, Arkansas, Colorado, South Dakota, Washington, Utah, and Texas.

Culture of rickettsiae.—Tissue cultures of minced chick embryo tissues suspended either in filtered human ascitic fluid or a modified Baker's solution containing chicken serum have proved suitable for cultivating the rickettsiae of Rocky Mountain spotted fever, endemic typhus, epidemic typhus, boutonneuse fever, and Brazilian spotted fever. Recent tests, however, suggest that the yolk sac of the developing chick egg is superior to other media tried.

Relapsing fever.—Three strains of spirochetes were isolated from *Ornithodoros parkeri* collected near Rock Springs, Wyo. Certain hybrids of *O. turicata* and *O. parkeri* will transmit the strain normally carried by the former, others the one normally carried by the latter. Guinea pigs are susceptible to strains from *turicata*, *parkeri*, and *hermsi*. Infected *turicata* larvae were collected from rodent burrows in northwestern Texas.

Tularaemia.—*Bacterium tularense* was found to be resident in the native tick fauna of Alaska. Circumstantial evidence suggesting transmission to man by *Amblyomma americanum* has been obtained in the south-central States. *B. tularense* persists for extended periods, with undiminished virulence, in the tissues of *O. turicata* and *O. parkeri* (over 300 days already shown in former) but is not transmitted by them.

Colorado tick fever.—A temporary summer field laboratory for the study of this infection was established at Laramie, Wyo., in May 1938.

Nine mile fever.—The causative agent of this tick-borne infection is a Gram-negative, intracellular, pleomorphic rickettsia-like organism. Berkefeld filtrates of infectious blood serum or tissue suspensions are infectious. It grows only in tissue culture and best in the yolk sac of the developing chick and, depending on the type of culture, can be grown either as a "rickettsia" or in a phase which has not been demonstrated microscopically. It has been transmitted experimentally by various ixodid ticks and survives for a long period in, but is not transmitted by, *O. turicata*.

Amblyomma maculatum infection.—A rickettsial agent that produces in guinea pigs a short febrile period and typical scrotal lesions has been isolated from *A. maculatum* collected in Texas. It shows affinities with boutonneuse fever in particular and also with Rocky Mountain spotted fever and endemic typhus.

Sylvatic plague.—Birds, particularly the raptorial species, are possible agents in the dissemination of sylvatic plague. They harbor rodent fleas, transport flea-infected rodent carcasses, scatter inedible portions of such carcasses, and viable plague bacilli have been demonstrated in casts.

Miscellaneous results.—Repeated attempts to transmit various rickettsial agents by *O. turicata* have proved negative. Transmission of Rocky Mountain spotted fever has been accomplished with *O. parkeri*, however, and eggs from infected females contain active virus. Boutonneuse fever has been transmitted by adult *D. andersoni* that ingested virus as nymphs. Further attempts to transmit equine encephalomyelitis with *andersoni* have again been negative. Several new species of ticks and fleas have been described.

FIELD STUDIES OF TUBERCULOSIS

The intensive studies of population and environment in Giles County, Tenn., and in Coffee County, Ala., were continued.

A house-to-house canvass of each county by trained public health nurses covering 12,653 families was completed. Preliminary tabulations of the data collected indicate that damaging tuberculosis is five to ten times more prevalent in Giles County than in Coffee County and that general economic and dietary conditions average better in the former than in the latter and suggest that unrecognized natural factors predominantly influence the tuberculosis situation in the two regions.

Tuberculin (Mantoux) tests and X-ray examinations of chests to cover 20 percent of the population in the two counties were begun and were applied to about 3,000 persons in each county. Differences in results obtained with various supposedly standard preparations of tuberculin were discovered and studied. This clinical survey so far indicates: (1) About 50 percent of the school children in Giles County as against less than 1 percent of the school children in Coffee County have calcified lesions; (2) a much higher incidence of parenchymal (reinfection type tuberculosis) in Giles County than in Coffee County; (3) about the same degree of skin sensitivity to the same preparation and dosage of tuberculin in the two counties, and (4) lack of correlation between tuberculin sensitivity and calcified lesions in Giles County, such lesions being as frequent in tuberculin negative as in tuberculin positive individuals and thus checking with the findings of Stewart, Gass, and others in Williamson County, Tenn.

Special studies of solar radiation, including measurement of total daylight and of ultra-violet rays, hygrothermographic recording of air temperature and humidity for correlation with ultra-violet radiation, intensive geological surveys, chemical and physical studies of soils, and chemical analyses of water and of locally produced foods of the two areas were carried on. Among findings to date are (1) significantly more total daylight, especially during the winter months, in Coffee County during the 2 years of observation and (2) a somewhat higher calcium and phosphorous content in certain vegetables from Giles County and higher content of other minerals, notably iron and sulphur, in those from Coffee County.

MALARIA

Research studies were carried on in field stations of the Office of Malaria Investigations located at Memphis, Tenn.; Columbia, S. C.; Savannah, Ga.; Miami, Fla.; Ancon, Canal Zone; and Washington, D. C.

Research in biological control of *Anopheles* has been continued. Considerable progress was made in limnological studies of waters producing this genus of mosquito. In addition, studies were conducted on light, pH, and other physical and chemical factors required by *Anopheles* larvae. The results of these studies are, as yet, indeterminate.

Malaria control by use of drugs is still a controversial subject. The ground work for a comprehensive study of the prophylactic effect of atabrin upon malaria rates was prepared and the study initiated during the year.

Studies on the fate of sporozoites of the malaria parasites between the time of inoculation and appearance of trophozoites were conducted, with indeterminate results.

Research in malaria therapy of paresis was conducted, with special emphasis on the bacteriological sterilization of sporozoite cultures, with as yet unsuccessful results. A corollary study was made of the compatibility of species of malaria parasites. There is evidence to indicate that *P. vivax* and *P. malariae* in white patients are not compatible in the peripheral blood, and that one quickly disappears.

In connection with malaria therapy studies it was found that a patient with quinine idiosyncrasy tolerated well split doses of sulfanilamide (about one-third strength).

Facilities for research in avian malaria were inaugurated toward the end of the fiscal year. The laboratory now possesses a well established strain of avian malaria in a large bird (pigeon).

Studies were conducted on the efficacy of various materials used for lining inverts of drainage ditches. Experiments have been conducted using monolithic construction, precast flat slab tongue and groove, and waste materials, such as brickbats, broken glass, etc. In addition, studies were made relative to the prevention of erosion of ditch banks by means of sodding. There is evidence that thin sections of concrete ditch lining, relatively narrow, cast in place, may prove efficacious. The results of the studies are, as yet, inconclusive.

Research on bionomics of *A. walkeri* resulted in the disclosure of their preferential breeding and diurnal resting places, which are the saw grass and button bush sections of Reelfoot Lake, Tenn.

Research was conducted in malaria immunology, and while much valuable and specific information has been obtained in the nature of immune reactions, the results of the work are still indeterminate.

Taxonomic studies of mosquitoes, particularly the anophelines of the Caribbean area, were continued. Considerable effort was devoted to keying species of incriminated vectors of jungle yellow fever.

Experiments on disinsectization of airplanes engaged in intercontinental traffic were continued, so far with negative results.

In cooperation with the Tennessee Valley Authority, studies were made on the efficiency of various methods of airplane dusting with paris green as an *Anopheles* larvicide.

A statistical study of rural populations of the malarious counties was initiated toward the latter part of the year.

The thick film laboratory examined 3,800 slides, of which 2.8 per cent were found positive for malaria.

EPIDEMIOLOGICAL STUDIES

Attention has been paid in these studies to possible changes in the character of poliomyelitic infection. For each of the past 4 years poliomyelitis has prevailed with epidemic intensity in some part of the southern half of the United States, regions in which reported cases had hitherto been less frequent than in the northern half. The disease has previously shown variation, from one outbreak to another, as to season, fatality rate, and intensity of spread. Experimentally also the virus from different outbreaks has been observed to vary as to virulence for the experimental animal, and there have been reported distinct immunological differences between such viruses. In the latter half of 1937 an outbreak occurred in Texas which permitted definite observation of variation from the usual distribution of paralysis with regard to the part of the body affected. The 16 cases occurring in Austin were investigated by the Public Health Service and 14, or 87 percent, were found to have involvement of the muscles of speech, swallowing, or breathing. No recent outbreak has been reported in which such involvement was present in more than 10 percent of the paralytic cases.

The impression is prevalent that poliomyelitis is becoming less of an infantile disease and more of a disease of older children and adults. Any such apparent tendency should be balanced against the marked change in the age distribution of the population of the United States. The Office of Epidemiological Studies therefore compared the trends for 25 years in the death rates for poliomyelitis at different ages with similar trends in age specific death rates for meningitis, diphtheria, scarlet fever, measles, and whooping cough, in the registration States of 1910.

For whooping cough and measles the spread between the rates for the most frequently attacked (younger) age groups and the least frequently attacked (older) age groups has increased slightly during the 25 years, indicating that these diseases continue to select the very young as much as ever. For the other diseases, meningitis, diphtheria, scarlet fever, and poliomyelitis, this spread has definitely decreased, especially for scarlet fever and poliomyelitis, in each of which the decrease is 30 percent on a logarithmic scale. Fatal poliomyelitis has therefore lessened its preference for the younger ages, irrespective of the change in age distribution of the population, but this tendency is shared to some extent by other juvenile infections. This comparison omitted the outbreak of 1934 in southern California in which a high proportion of older cases was reported, especially among hospital personnel. The publication of the report on this hospital outbreak shows that the greater part of the epidemiological evidence would make it logical to consider the disease among the hospital workers to be poliomyelitis; clinically, however, the absence of typical histories of poliomyelitis would yield the final conclusion against that diagnosis.

DIVISION OF PATHOLOGY

Surg. R. D. LILLIE in charge

During the year 2,377 surgical specimens were examined for Marine Hospitals, penitentiaries, Indian Service hospitals, and other agencies.

Material from 287 autopsies was received largely from the same sources, including also material from special studies on untreated syphilis being conducted by the Venereal Diseases Division in Alabama, a detailed study of the topographic brain pathology of poliomyelitis in cooperation with a subgroup of the Poliomyelitis Committee, Weil's disease, post-vaccination and other virus and bacterial encephalitides, cases suspected of leprosy, psittacosis, and tularaemia, and one case of Rocky Mountain spotted fever. In connection with this service studies are being made on the incidence of pinworm infestation of the appendix in relation to appendiceal pathology, and the incidence of various types of tumors in seamen and other Public Health Service beneficiaries and, recently, in American Indians. This material is further utilized in preparation of reports of unusual cases and in training junior officers in pathologic histology.

The service of diagnosis of psittacosis infections in parrots and parrakeets for State and local health departments and for national quarantine stations has been continued, with some increase in the number of birds submitted over previous years.

A study of the pathologic histology of vanadium poisoning was completed for the Foods and Nutrition Division of the Bureau of Home Economics.

In experimental pathology studies have been made of the pathologic anatomy and histology of various conditions under study in various divisions of the Institute, covering a total of 1,425 animal autopsies. Studies were made on Weil's disease, Chagas' disease, encephalitis, lymphocytic choriomeningitis, poliomyelitis, typhus, spotted fever, mycoses, pseudotuberculosis, pertussis, and tuberculosis in cooperation with the Infectious Diseases Division, on Vincent's stomatitis, riboflavin and B₆ deficiencies, scurvy, cystine amine, and low protein diets with the Division of Chemistry, on selenium and sulfanilamide derivatives with the Division of Pharmacology, on the toxicology of methyl violets with the Division of Zoology, and on tumors with the National Cancer Institute.

Within the Division an investigation of the behavior of hemosiderin toward acids was made, and various experiments in the improvement of technical methods carried out.

DIVISION OF PHARMACOLOGY

Pharmacologist Director CARL VOEGTLIN in charge

The selenium problem.—Field surveys of a selenium endemic region in southern South Dakota and northern Nebraska revealed that, besides grain and vegetables, the chief sources of selenium for man are dairy products, eggs, and meats. Though some selenium was found in some of the water, this appears to be of minor importance as a source of selenium. Analysis of samples of wheat and corn flour distributed by a local milling company disclosed sufficient selenium to account for the urinary excretion of this element in some city dwellers who have come under observation through the local medical profession. On the basis of the experimental data on the relation of the excretion level of selenium in the urine to the daily intake in chronic poisoning in animals, it has been estimated that a daily absorption of from 1 to 10 mg of selenium in man is probable. Under

more normal conditions with a greater abundance of locally produced selenium-bearing foodstuffs a higher absorption of selenium is probable.

Experiments on the toxicity, cellular pathology, and functional disturbances resulting from the continued ingestion of naturally occurring food selenium have been in progress for the past year. The chief effects observed so far have been (1) gastric irritation, (2) chronic hepatitis, (3) pericardial pleural and peritoneal effusions, and (4) in some instances hypochromic microcytic anemia. In rabbits marked hyperplasia of the thyroid has been observed frequently, but it is not certain whether this is the direct result of selenium. Studies on gastric function in cats have not given conclusive evidence concerning the alleged effects of selenium on gastric acidity. Studies on liver function, based on the retention of intravenously injected dyes and bilirubin, indicate a good correlation with the morphological changes. Especially useful in this connection appears to be the dye diiodo-tetrachlorfluorescein, with the aid of which it has been possible to detect liver dysfunction before marked morphological changes could be demonstrated microscopically.

Studies on the fate of selenium in the organism have shown the following: Intravenously injected inorganic selenium leaves the blood stream slowly, is absorbed selectively in certain tissues, notably the liver and kidney, the latter being concerned chiefly with its elimination from the body. Chronically ingested food selenium is stored progressively in protein combination in all the tissues of the body, its excretion persisting for several months after its administration is discontinued. Selenium has been demonstrated to pass through the placenta from the mother to the mammalian fetus, though no definite injury to the fetus has as yet been observed.

Progress was made in some of the biochemical aspects of the selenium problem. A method was devised for the differentiation between selenium in protein combination, nonprotein selenium, and inorganic selenium as they might occur in body tissues and fluids. The analytical procedure for the determination of selenium in urine has been improved and greatly shortened. Work on increasing the sensitivity of the method applicable to small amounts of blood is in progress. A procedure by which selenium can be separated from its natural combination with protein in grain without dissolution of the protein has also been worked out.

Investigations on the effects of selenium on tissue metabolism have shown that both selenite and selenate inhibit completely the oxygen consumption of liver, kidney, muscle, and brain, and partially that of tumor tissue. The sensitivity of different tissues varies widely. The initial effect of selenium on liver is an increase of oxygen uptake which can be abolished by a preliminary fasting period or by the addition of iodoacetate to the substrate, indicating that the rise in oxygen uptake is the indirect effect of increased aerobic glycolysis. Addition of various intermediary metabolites and other substances in an attempt to antagonize or reverse the action of selenium on cellular respiration has given indifferent results. Lactate, succinate, citrate, glycogen, cevitamic acid, glucosamine and lactoflavine were without effect, while pyruvate and reduced glutathione afforded some protection if added simultaneously with the selenium. Tissues pois-

oned with selenium continue to catalyze the oxidation of p-phenylene diamine indicating that the cytochrome oxidase system is intact, the point of attack being the dehydrogenase system.

The detoxification of selenium *in vivo* has been studied. Several physiologic reductants were employed in an attempt to protect against selenite poisoning. Glutathione, cevitamic acid, levulose, and glucose have had no effect. Glucosamine has been found to afford some, though limited, protection.

Chemotherapy.—Work in bacterial chemotherapy has progressed chiefly along the following lines: (1) Development of new compounds, (2) pharmacology and toxicity of sulfanilamide and new compounds, and (3) combined drug and serum therapy.

New compounds.—A large number of new compounds have been prepared and studied. Sulfanilyl-sulfanilamide (disulfanilamide) showed promising results upon experimental animals but in a preliminary trial in man it caused a peripheral neuritis in several instances. Among other compounds the most promising experimental results were obtained with the formaldehyde sulfoxylate derivative of diamino diphenylsulfone. This compound possesses the advantage of being freely water soluble, and upon injection into mice it gives a therapeutic index against streptococci five times as favorable as sulfanilamide. It was also more active than sulfanilamide against pneumococci.

Antistreptococcic action has also been shown for some new types of compounds chemically different from sulfanilamide in that they contain no sulfur; these findings indicate that sulfur is not essential to therapeutic action and open the field to a new line of chemical approach.

Toxicity studies.—Upon rabbits and chickens it was shown that sulfanilamide and di-sulfanilamide possessed a cumulative toxicity in that daily administration of nonfatal doses caused symptoms and fatalities when continued for 3 to 10 days. It was also shown that delayed toxicity could occur in that deaths might occur as long as 2 to 3 weeks after cessation of therapy. In chickens a characteristic picture is produced, of motor weakness, chiefly of the legs, along with gradual emaciation and death.

Combination therapy.—A synergistic action of combined drug and serum therapy has previously been demonstrated for meningococcal and pneumococcal infections in mice. This same increased effect was found in streptococcal infections when an antibacterial type of serum was used along with sulfanilamide. The results with combined therapy were more favorable than the sum of the effects of drug and serum therapy when used separately.

DIVISION OF PUBLIC HEALTH METHODS

Surg. J. W. MOUNTIN in charge

Investigations initiated during the fiscal year pertain to cancer, heart disease, tuberculosis, and pneumonia; those investigations carried forward from the preceding year are concerned with particular aspects of child hygiene, stream pollution, milk and food sanitation, public health facilities, and general morbidity. Aside from certain studies in stream pollution that relate to the mechanism of biochemi-

cal oxidation, the Division has in the main directed its efforts toward better definition of health problems and the assay of procedures that are adaptable to public health practice. Within the organization there has been a blending of resources so that the several techniques represented on the staff may be directed toward the particular problems under investigation.

MORBIDITY AND MORTALITY

Morbidity and mortality, together with the disability which illness entails, are used as measures of the vitality of different groups in the population and as guides for directing public health effort. Data bearing on these points come to the Division from several sources and hence present different aspects of the general problem induced by sickness. Certain of these data are collected as an administrative routine while others come through special canvasses covering representative samples of the population under study.

Current reports.—Provisional mortality summaries continue to be prepared on a quarterly basis from data supplied by the State health departments. These summaries include not only the death rate from all causes but rates for a considerable number of specific conditions together with comparative data for preceding years; they constitute the earliest available material on the current mortality situation. Assistance was rendered to the Division of Sanitary Reports and Statistics in the analysis of communicable disease reports received from the States. These are summarized at 4-week intervals for publication in the Public Health Reports.

National Health Inventory.—This study of illness and medical care begun in 1935 has now reached the stage of final analysis and presentation of data. While the several individual units that comprise the project as a whole were conducted as part of the Federal work program employing labor from relief rolls, a significant proportion of the regular Division staff was occupied on supervisory and analytical work.

The survey of general health has been directed toward the elaboration of existing information and the isolation of new facts; these include the incidence of acute and chronic disease, extent of physical impairment, and the distribution of medical service. Covering as it did some 2,800,000 persons, the survey has made possible a study in great detail of the several social and economic factors that seem to have a bearing on illness and medical care. Preliminary bulletins covering the following subjects were prepared during the year: (1) Amount of disabling illness for the country as a whole, (2) illness and medical care in relation to economic status, (3) the prevalence and causes of orthopedic impairments, (4) illness and unemployment, (5) incidence of chronic disease, (6) accidents as a cause of disability, (7) degree of crowding and existence of sanitary facilities in urban houses. Health survey material also provided in large part the basic data used by the Interdepartmental Committee to Coordinate Health and Welfare Activities in preparing its recommendations for a National Health Program.

Communicable diseases.—In connection with the National Health Inventory it was possible to collect from persons under 25 years of

age in more than 200,000 families communicable disease data relative to occurrence of selected diseases, mortality experience, and amount of immunization. This study represents a larger population coverage than any heretofore completed. Hence it will be feasible to make more extensive analysis of many aspects of communicable disease than ever before. Especially valuable are points on the rarer conditions such as poliomyelitis, meningitis, and encephalitis. It should also be possible to derive a fairly reliable estimate of disease incidence in relation to immunization history, of the percentage of cases reported to health departments, and of fatality rates.

Hearing.—Audiometric tests and otorhinolaryngologic examinations were made on more than 10,000 subjects who had been enumerated in the health inventory. These records, which cover measurements of hearing loss in relation to age and sex, clinical history of deafness, and observable pathology of the ear, are already proving of great value for standardization of audiometers and other diagnostic devices. Work is nearing completion on the first estimate ever to become available of the total amount of deafness in the general population according to type of deafness, degree of hearing loss, together with age, sex, occupation, and other characteristics of the afflicted individuals.

Other elements of the National Health Inventory, presented elsewhere, are: Occupational morbidity and mortality, business census of hospitals, and obstetrical practice in Michigan.

Health of transients.—Recent economic disturbances which increased the normal migration of populations served to bring into relief the problem in illness and medical care experienced by those who have no legal residence. Responsible officials from those areas to which people in large numbers are attracted by alleged opportunities for employment or health requested that the problem be defined in its manifold aspects. A study designed to this end was, therefore, undertaken. At the close of the fiscal year abstracts had been made of data already assembled by emergency agencies that serve the transient population, and schedules had been completed in the field on approximately 13,000 transient cases, about one-third of which were families. These cases were drawn from 21 cities and 3 special camps that give representation to 15 States. Processing of the data had only reached the coding stage at the close of the fiscal year; hence it is not possible in this report to present findings or to draw conclusions.

Cancer.—Specific allotment of funds from the National Cancer Institute made possible a statistical study regarding the extent and characteristics of cancer morbidity and mortality. For this study the United States Census Bureau supplied original mortality records for each year extending back to 1900; thus it will be possible to make many analyses which have not appeared in published reports.

The amount of cancer in the general population has been a subject for dispute. Surveys based on the family interview technique usually disclose about two living cases per annual death. There was reason to believe that this is an understatement of the problem. In a further attempt to resolve the question this Division adopted the method perfected in the Venereal Disease Division, by which cases under treatment of a physician, clinic, or hospital during a 12-month period are

taken as the measure of incidence. Surveys conducted along this line have been completed in Atlanta, Detroit, Pittsburgh, Chicago, and in the counties in which these cities are located. A survey of New Orleans is now in progress. The data from all cities have not as yet been prepared for analysis but a preliminary tabulation of returns from Atlanta shows about 5.2 living cases of cancer per annual death. In the final tabulations rates will be computed by site of lesion and in relation to several items descriptive of the individual.

Baltimore survey.—Through the several bodies of data accumulated by the Public Health Service general problems relating to morbidity and medical care have been described in broad outline. Additional information of a meticulous nature is necessary for defining the details. From a socio-economic standpoint more should be known about time and income loss occasioned by illness, especially the chronic diseases; the various elements of care required by different illnesses, together with the costs entailed; and the effect of illness on the standard of living. Out of all the studies made so far has emerged without exception the fact that excess illness is associated with low income. This common factor of poverty needs to be broken down into its several manifestations and each in turn should be assigned its proper weight. It is believed that the Eastern Health District of Baltimore, because of its close association with Johns Hopkins Hospital and the Johns Hopkins School of Hygiene, offers unusual opportunities for this type of study. The actual collection of data was started toward the close of the fiscal year covered by this report.

PUBLIC HEALTH FACILITIES

Health departments, hospitals, and clinics have been studied with respect to their geographic location, financial resources, content of program, and method of administration. The most casual observation will reveal regional differences in provision for health department service, and many localized defects of organization that are attributable to insufficient budget and lack of trained personnel within the staff. More detailed inquiry shows that health departments are not directing their principal efforts toward major causes of morbidity and mortality. In their attempts to influence health habits and practices, health departments resort to individualized teaching, which is done through personal contact usually made by nurses and inspectors. This method, known to be very expensive, does not, on close scrutiny, seem to be as productive of results as once supposed. The question is therefore raised whether group methods of instruction might not be substituted, thereby releasing funds and workers for measures having a larger element of personal service, especially care in time of illness.

Inquiries into the prevailing scheme of hospital organization reveal many items of interest. Institutional care of the insane has been developed largely on the basis of tax support, with State and local governments maintaining about 96 percent of the beds. Very much the same situation obtains for tuberculosis sanatoria, although the proportion of beds in governmental institutions is somewhat lower, being 80 percent. In contradistinction the great majority of hospitals offering general care are operated on a voluntary basis by individuals

with a proprietary interest or by corporations not organized for profit. Governments maintain a significant proportion of the beds but most tax-supported hospitals containing these beds are located in centers of population and wealth. Outside these centers hospital service is supported almost exclusively through fees paid by patients. Especially in the smaller cities and rural areas admission to a hospital usually signifies an acute surgical emergency.

CHILD HYGIENE

Child hygiene investigations for the fiscal year just completed have been concerned with certain chronic conditions that so commonly have their origin during the period of growth and development. The conditions given special attention were dental caries, cardiac disorders, tuberculosis, and deafness. In addition, the child hygiene office supervised the analyses of data on the hearing study, and on the study of obstretrical care in Michigan, each of which constitutes a part of the National Health Inventory.

Dental caries.—A contribution especially worthy of note is the development of a method for expressing dental caries in terms that are susceptible to statistical analysis. Henceforth it will be possible for dental examiners to supply comparable data on amounts of caries, and tooth loss, in relation to chronological age of the patient, and in terms of tooth age, i. e., the period during which the tooth is exposed to the environment of the mouth. By using this method it has been demonstrated that dental caries is directly related to tooth age; thus time of eruption explains presumed variation in susceptibility to caries manifested by teeth in different morphological groups, and the alleged excess rates of tooth decay among girls as contrasted with boys. Another study has revealed a great similarity in the caries experience of biologically related members in the same household. The data at hand show that Indians, as a population group, have high rates of dental caries when contrasted with the whites. Exceptions to this general rule are to be found in the Southwest, where certain tribes are remarkably immune. Some significance may be attached to the observation that fragments of original tribes exhibit essentially the same behavior pattern with respect to caries even though at present these tribal units are found in geographic locations where the caries rates of indigenous populations are distinctly different.

Cardiac disorders.—In this field two lines of inquiry are being pursued: One is a series of cooperative studies, with the Harriett Lane Home at Johns Hopkins Hospital, in which particular attention is given to the epidemiology of acute rheumatic fever. The second study represents an attempt to simplify cardiac diagnosis in children. The studies on rheumatic fever are still inconclusive, but the evidence collected to date shows that the disease has a tendency to recur in particular families.

It is believed that the electrostethograph offers distinct possibilities for objectifying cardiac diagnosis. Tracings obtained through the use of this instrument seem to give a visual representation of cardiac sounds that is correct in all essential respects. By using this method, school physicians should be in much better position than they now are to detect cardiac pathology through routine physical examination.

Although work was started late in the fiscal year, it was possible to examine with the electrostethograph nearly 2,000 school children in Hagerstown, Md. Selected samples were checked with the electrocardiograph and the ordinary methods of cardiac examination. These records are being studied with a view to establishing norms for a general school population.

Tuberculosis.—Considerable doubt has arisen concerning the reliability of the tuberculin test as a screening device in case-finding programs. Since tuberculin testing is used so extensively in public health practice a special study to clarify the points at issue seemed indicated. The first step taken was to establish a complete population base by making an X-ray film on every school child in Hagerstown. Those that consented were given an intradermal test using the purified protein derivative. The factor of consent alone appears to introduce a selection in favor of children with low rates of infection. On comparing the tuberculin reaction with X-ray films one finds about the same proportion of false positives as missed cases. Thus it would seem that the tuberculin test, as used in this study, is not a reliable instrument of diagnosis. Further work is planned to locate the sources of error and, if possible, to establish the range of usefulness for the test.

ENVIRONMENTAL HYGIENE

While the Division of Public Health Methods has broad interests in the effects of environment on health, due to limitation of funds the necessity has arisen for concentrating effort within limited fields. Attention has therefore been centered on water and milk, the two controllable vehicles that are most likely to transmit infection. Milk sanitation as carried on by the division combines studies on pasteurization and advisory assistance to State and local health agencies. Fundamental research characterizes the work on water, and this research has featured measures for the prevention of pollution rather than actual water purification.

Milk.—Since pasteurization is the final safeguard to which all milk should be subjected, it is highly important that this process be carried out in the most effective manner possible consistent with economy. Fundamental to this end is the question of critical time and temperature combinations. Heretofore, determinations on this point, involving the use of plant-size equipment of different commercial types, have been hazardous and expensive owing to the necessity of using pathogenic organisms. Now it appears that this difficulty has been resolved through the isolation of a heat-resistant organism of the colon group (strain 3 U). As a further measure towards standardizing and cheapening procedures that might be used in testing pasteurizing equipment, buffered distilled water, skimmed milk, and evaporated milk have been used separately as suspending media. From these experiments the tentative conclusion may be drawn that substitution of water for milk lessens the reliability of the experimental results. Variation in the behavior of the organism may be due to other factors and these are being pursued. To this end cultures have been standardized by subjecting large batches to quick freezing and then evaporation under vacuum in the Flosdorf-Mudd lyophile apparatus. Consideration has also been given to the possible effect of utensils made of stainless steel, copper, and glass and also to

differences in temperature at which the cultures were incubated. Another feature of pasteurization, the possibility of contamination through the use of heat regenerators, was made the subject of special inquiry.

As stated previously, advisory service to States and local health authorities has been an important feature of milk sanitation. Assistance involving the presence of a consultant for varying periods of time was rendered to 28 States, and directly to 2 large cities. As a further process of orientation in the field of urban milk sanitation a special study through a questionnaire supplemented by limited field survey work was made on a Nation-wide basis, covering places having 1,000 population or more. The findings will soon be published.

Water.—The full utilization of streams and other bodies of water for their manifold purposes requires that pollution be kept within reasonable limits. Investigations have therefore been directed toward arriving at a better understanding of the processes involved in natural recovery of polluted water and toward perfecting methods of sewage treatment. The studies embrace field observations and laboratory experimentation.

Installation of a sewage treatment plant at Columbus, Ohio, afforded opportunity to study the recovery of Scioto River water. Last year samples of water and river mud were examined by various chemical and biological methods to show seasonal change prior to sewage treatment. During the ensuing year similar observations will show what happens as different units of the sewage treatment plant are put into operation.

Laboratory studies in biochemical oxidation of the activated sludge process were continued through the period covered by this report. These studies have been aided immeasurably through the isolation in pure cultures of zoological bacteria capable of producing material which behaves very much like natural sludge. Studies show that the rapid oxidation accomplished in the activated process as contrasted with natural purification is due primarily to the greater amount of available oxygen and the increased mass of organisms. Bacteria-free cultures of *Sphaerotilus natans*, a fungus associated with "bulking" of activated sludge, have been studied to determine stimuli causing their explosive growth in activated sludge.

The chemical studies at the Cincinnati station have included investigations of hydrogen content of sewage, removal of organic matter, and oxidation of certain substances, such as amino acids, carbohydrates, alcohols, aldehydes, and organic acids, under conditions of normal and activate sludge. In connection with the foregoing chemical and bacteriological studies, it was found advisable to reexamine tests for determining dissolved oxygen. Out of these studies has developed the conclusion that the vacuum method is the most reliable, while next in order of preference is the unmodified Winkler test.

DIVISION OF ZOOLOGY

Dr. WILLARD H. WRIGHT in temporary charge

During the year, work was continued on projects dealing with trichinosis, oxyuriasis, and amoebiasis, conditions caused by the three animal parasites of man which commonly surmount sanitary barriers.

TRICHINOSIS

Incidence and epidemiology.—Surveys on the incidence of trichina infestation in man have been continued in an effort to obtain information concerning the distribution of the parasite in the general population.

In a base series comprising material received from hospitals in Washington, D. C., Baltimore, Md., and certain other cities, there have been examined 2,000 diaphragms, of which 17.1 percent were positive for trichinae.

In a series comprising material received from hospitals selected at random in various parts of the United States, 375 diaphragms have been examined, of which 18.8 percent were positive for trichinae.

To determine whether a previous trichina infestation may have influenced the hospitalization of individuals from whom diaphragms were obtained, examinations were made of diaphragms from persons meeting traumatic death. Of 98 diaphragms in this series, 15.3 percent were positive for trichinae.

That adherence to the Mosaic Code is *per se* a protection against trichinosis is evidenced by the examination of 169 diaphragms from Jews, of which only 1, or 0.6 percent, was positive for trichinae.

In an effort to establish distribution figures for trichinae in man in all parts of the United States, diaphragms were obtained from certain States in which trichinosis had never been reported. Of these States, an examination of 24 diaphragms from Arizona disclosed an incidence of 12.5 percent; an examination of 77 diaphragms from New Hampshire disclosed an incidence of 16.9 percent; and an examination of 26 diaphragms from Oklahoma disclosed an incidence of 26.9 percent.

Symptomatology.—Dogs experimentally infected with trichinae gave a typical eosinophilic response which reached a peak on the eleventh post-infection day; these animals gave positive reactions to the precipitin test, but failed to react to the intradermal test. Rhesus monkeys experimentally infected with trichinae showed marked clinical symptoms of trichinosis, but showed no marked rise in eosinophiles.

Diagnosis.—Further improvements have been made in trichina antigen and there is now available for diagnostic use an antigen more stable and more potent than any previously employed. Over 500 intradermal doses of this antigen were supplied to physicians and hospitals during the year.

Studies have been made on the antibody-antigen reaction in trichina-infested laboratory animals with a view to developing a diagnostic procedure suitable for detecting trichinosis in the early stages. Noninfected rabbits injected with the blood serum of rabbits infected with trichinae gave positive precipitin reactions for trichinosis. There was a remarkable regularity in the interval between the time of infection of primary animals and the appearance of antibodies in the secondary animals, regardless of the time of injection of the secondary animals with the blood serum of the primary animals.

OXYURLASIS

Incidence.—Studies of various population groups have been continued. During the year, approximately 1,100 persons in or near

Washington, D. C., were examined, bringing the total to about 2,150 persons examined, with findings of pinworms in approximately 41 percent. Included in these findings were incidences of 57 percent in 504 boys in a boys' camp, and 42 percent in 112 children attending a private nursery school; the remaining persons were from the general population and for the most part were contacted through a clinic at Providence Hospital. Among the institutionalized persons, there was found in Washington an incidence of 14 percent in 250 boys and, in Georgia, an incidence of 53 percent in 72 female patients at a State hospital. In a necropsy series in children, pinworms were found in 9, or 29 percent, of 31 children.

Biology.—Tests have been made to determine the value of various disinfectants, soaps, and cleansing agents in destroying pinworm eggs. Thus far only coal-tar disinfectants in strong concentrations have proved rapidly effective. The survival of eggs under varying conditions of humidity and temperature has been studied; under favorable laboratory conditions larvae have been hatched from eggs kept for 14 days, and moving embryos have been observed in eggs kept for 20 days. Low humidity and high temperatures are unfavorable for survival. Several anal ointments tested failed to prevent oviposition and the development of embryos to the infective stage in the eggs deposited. By comparatively precise techniques, counts were made of the eggs present in 20 gravid female pinworms, the counts ranging from 4,672 to 16,888 eggs per worm; the arithmetical mean was 11,105 and the mean of the extremes was 10,780. Dust studies were made in households where the members were heavily infested with pinworms; pinworm eggs were found in the dust of all the rooms.

Symptomatology.—In a study of approximately 200 cases of oxyuriasis and 50 noninfested controls, symptoms encountered were anal pruritus and discomfort, restlessness, nausea and vomiting, and mild vulvo-vaginitis; in a few individuals the pinworm infestation apparently resulted in allergic manifestations. There is apparently no correlation between symptomatology and intensity of infestation since factors such as nervous irritability and hypersensitivity apparently play a considerable role in the reaction of the patient. Eosinophilia, if present at all, is slight and not of any clinical significance.

Diagnosis.—During the year, methods of diagnosis, other than diagnosis by the NIH cellophane swab method, have been largely abandoned, because of the simplicity and effectiveness of this latter method. Approximately 7,000 diagnostic swab examinations were made during the year.

Dermal and intradermal skin tests with pinworm antigen indicated that the dermal test is very specific with an antigen dilution of 1:100. The intradermal test, with antigen dilutions up to 1:5,000, gave positive reactions in nearly all individuals infested with pinworms and not reacting positively to the dermal test. However, individuals infested with worm parasites other than pinworms occasionally reacted positively to this test.

Therapy.—Critically checked tests on several hundred individuals treated with enteric-coated gentian violet tablets indicated that this drug is approximately 90 percent effective in eradicating pinworm

infestations. The use of gentian violet tablets provided with a new and improved type of coating gave even better results and provoked fewer and less marked reactions in treated individuals. These tablets cleared up permanently cases of pinworm infestation refractory to other treatments.

AMOEBIASIS

Incidence.—In a series of necropsies, following traumatic death, made at New Orleans, infection with *Endamoeba histolytica* has been found in approximately 5 percent of the cases, a figure somewhat below the incidence figure in the ambulatory clinic population in that city. The somewhat higher age of individuals falling within this survey is believed to account for the smaller incidence in this type of case.

Diagnosis.—In the New Orleans studies, an improved method has been worked out for the detection of amoeba cysts in stools. The method consists essentially in centrifugal flotation with a solution of zinc sulfate of a specific gravity of 1.180. When compared to several other methods used for the recovery of cysts, this technique was found to surpass all others in efficiency.

OFFICE OF COOPERATIVE STUDIES

Medical Director J. P. LEAKE in charge

Of the studies being carried on in cooperation with other institutions, special mention may be made of that on diphtheria prevention sponsored by the American Public Health Association. The evidence, though thus far incomplete, is definite that two injections of alum precipitated toxoid give blood immunity more uniformly than any other method in practice. In 4 months, every one of 62 children had the antitoxin content of their blood serum raised above one-thousandth of a unit per cubic centimeter by this method.

At Germantown Hospital cautious injections of killed staphylococcus suspension, or injection of products of the tubercle bacillus together with a mixed bacterial vaccine containing organisms found in bronchitis and bronchopneumonia, have been used in cases of pulmonary tuberculosis. The sponsor believes that in 96 out of 142 cases such treatment has aided recovery, or deferred the progress of severe disease. If artificially localized, a tuberculin reaction is usually nullified or reduced by the reaction from vaccine made from a pyogenic coccus and injected 1 to 24 hours subsequent to the tuberculin.

At the Henry Phipps Institute in Philadelphia an improved quantitative method has been developed in this cooperative work for estimating, in billions, the daily expectoration of tubercle bacilli, and has been applied to the comparison of colored with white patients having similarly advanced tuberculous disease. The most prolific dischargers of bacilli among the Negro race expectorate about 15 billion per day, and among the white race about 1 billion. Practically, this means that Negroes are apt to have the more acute disease, and are more likely to infect others.

At the Johns Hopkins School of Hygiene some of the supposedly fat-free diets which have been used by workers generally in demon-

strating fat-soluble vitamins have been found to contain definite fat. The possibility of there being a yet undiscovered fat-soluble vitamin is thus suggested and is being investigated.

At the George Washington Medical School an improved method was worked out for finding tubercle bacilli in urine by means of flocculation with phosphates at a neutral hydrogen-ion concentration.

NATIONAL CANCER INSTITUTE

Prof. CARL VOEGTLIN in charge

The National Cancer Institute and the National Advisory Cancer Council have been organized in compliance with the National Cancer Institute Act signed by the President on August 5, 1937.

The National Cancer Institute is administered as a division of the National Institute of Health under Asst. Surg. Gen. L. R. Thompson. Dr. Carl Voegtlin has been appointed the first Chief of the Institute, and Senior Surg. R. R. Spencer has been detailed as executive assistant.

The membership of the first National Advisory Cancer Council appointed by the Surgeon General is as follows: Doctors James Ewing, Francis Carter Wood, C. C. Little, Arthur H. Compton, James B. Conant, and Ludvig Hektoen, executive director. The council has held five meetings.

Grants-in-aid have been awarded totaling \$90,925. Harvard University received \$27,550, Dr. E. W. Wallace \$4,350, University of California \$30,000, Roscoe B. Jackson Memorial Laboratory \$9,900, National Research Council \$3,000, Dr. John J. Bittner \$3,200, University of Michigan \$1,800, Duke University \$2,625, Institute of Cancer Research, Columbia University, \$8,500.

Under the provisions of section 5 (b) of the National Cancer Institute Act 14 trainees as cancer specialists have been appointed.

Under section 5 (c) of the same act nine research fellows have been appointed.

Under section 5 (a) of the act bids have been accepted from three companies for a total of 10 g of radium, which will be distributed to various institutions approved by the National Cancer Institute for cancer treatment centers.

Provisions are being made for the remodeling of a part of the United States Marine Hospital at Baltimore, Md., to be used as a clinical cancer research center. This locality was chosen because of its proximity to the new National Cancer Institute, facilitating close cooperation between the two groups. All cases of cancer from the Public Health Service hospitals east of the Mississippi River will be brought to this clinic for treatment and clinical research.

Under the provisions of section 2 (g) of the act efforts have been initiated to cooperate with State health agencies in cancer control activities and to stimulate the interests of those States that do not have a cancer control program.

STATISTICAL STUDIES

Under the direction of Surg. Joseph Mountin studies of the incidence of cancer in both rural and urban communities were begun in the fall of 1937. Valuable information indicating a greater prevalence of cancer than is usually reported is being obtained.

EXPERIMENTAL STUDIES ON THE CAUSATION OF CANCER

The influence of heredity upon spontaneous and induced lung tumors was investigated. Backcross mice procured by using strains susceptible or resistant to spontaneous and induced lung tumors revealed that susceptibility to spontaneous lung neoplasms is inherited according to genetic principles, and that but one dominant factor may be involved in the inheritance of susceptibility to induced lung tumors.

It was shown, furthermore, that 1:2:5:6-dibenzanthracene, injected subcutaneously into susceptible mice, induces more lung tumors when injected in a fine suspension in a medium which can be readily carried from the site of injection.

A study of liver tumors in mice showed that strain C₃H mice develop hepatomas following injection of 1:2:5:6-dibenzanthracene and that the same type of tumor occurs spontaneously in mice of this strain. The hydrocarbon accelerates, therefore, the appearance of hepatomas in these mice.

A study of the response of eight strains of highly inbred mice to different types of tumor growth revealed that the strains varied in their susceptibility to spontaneous mammary and lung tumors, to transplantable tumors, and to chemically induced subcutaneous and lung tumors. None of the strains was susceptible or resistant to tumor growth in general.

Practically all mice of strain I spontaneously develop an unusual gastric mucosal hyperplasia. Studies are in progress to ascertain whether this condition has a genetic basis, is due to lack of vitamins, or is caused by a parasite. The condition, if not malignant, presents many features, the solution of which may give valuable clues to the nature of cancer of the stomach.

In collaboration with the Roscoe B. Jackson Memorial Laboratory work was continued on the importance of the so-called extrachromosomal (nongenetic) factors in the causation of breast cancer. Previous significant observations made at the Jackson Memorial Laboratory indicated that in certain strains of mice the mother's milk is important in the transmission of susceptibility to breast cancer. This year it was shown that foster nursing by C57 black mice (low tumor strain) greatly reduces the occurrence of breast cancer in C₃H mice (high tumor strain). The work has been extended to hybrids. The nature of the "breast cancer-producing influence" in the milk remains to be determined. Other studies showed that virgin female mice of strain C₃H have the same high breast cancer incidence (95 to 100 percent) as do breeding females of the same strain, but the average tumor age is higher in the virgin mice.

The studies on chemical carcinogenesis were continued in collaboration with the Department of Chemistry of Harvard University. Forty-one new compounds were tested for carcinogenic activity and a number of previously tested compounds were reexamined with variations in technic. About 1,800 necropsies were performed on experimental laboratory animals, and tissues were subjected to histopathological examination.

In the studies designed to ascertain which structural features of polycyclic compounds are essential to carcinogenesis, it was found that five rings in the condensed ring system are not required for car-

cinogenic potency. Simple tetracyclic compounds like the 5, 10-dimethyl-, 5, 9-dimethyl-, and 10-methyl derivatives of 1, 2-benzanthracene produced sarcomas in a high proportion of the mice, and hence are comparable with cholanthrene.

Tumors have been obtained not only with hydrocarbons but also with compounds having polar groups as substituents in the 1, 2-benzanthracene molecule. The 5-cyano-10-methyl, 5-chloro-10-methyl, 7-cyano-10-methyl, and 7-chloro-10-methyl derivatives were found to be carcinogenic. Tumors have been induced by the 10-CH₂CN, 10-CH₂OH, 10-CH₂O.COCH₃ and the 10-CH₂.COOCH₃ substituted derivatives of 1, 2-benzanthracene. The interest of these compounds lies in the fact that, like many naturally occurring phenanthrene derivatives, they contain OH, COOH, and OCH₃ groups, and that the CN and Cl substituents are reactive groups and may help to throw light on the possible reactions which these carcinogens may undergo in the body.

It was previously thought that even a slight degree of hydrogenation destroyed carcinogenic activity, but tumors have been produced in this laboratory by 1', 2'-dihydro-4'-methyl-3, 4-benzpyrene and 1', 2', 3', 4'-tetrahydro-4, 10-ace-1, 2-benzanthracene.

In an attempt more closely to approximate substances which theoretically could be formed in the body, nitrile, aldehyde, and similar substituents have been prepared, but have not yet been tested in mice. Acetylcholine, a natural body constituent, has been reported as being capable of inducing tumors. In order to confirm these observations mice have been injected regularly with acetylcholine and choline. The test has been in progress for three months; no tumors have yet resulted.

Last year a prolonged skin-painting test with creosote fractions and benzpyrene indicated that a certain (basic) fraction of the creosote, while not in itself capable of causing tumors, in combination with benzpyrene promoted the genesis of benzpyrene-induced tumors. Another test, lasting nearly a year, confirmed the original finding. The investigators term this a "co-carcinogen" effect.

Tumors of the brain have been obtained in mice following the insertion of pellets of methylcholanthrene into this organ. Some of these tumors have been tentatively classified as gliomas.

The most important aspect of chemical carcinogenesis is work which will throw some light on the nature of the chemicals which may be concerned in the causation of naturally occurring cancer in animals and man. Future studies will be directed as much as possible toward this line of approach.

The study of the mode of action of cancer-producing chemicals is one of the most important phases of cancer research. The action of methylcholanthrene, the most potent carcinogenic agent known, on tissue cultures of normal fibroblasts of rats and mice has, therefore, received further study. In last year's report it was mentioned that methylcholanthrene has a powerful action on these normal cells. The question arose as to whether this action was caused by an impurity of the compound used or by a photosensitization by the fluorescent methylcholanthrene. Repetition of the previous experiments with a highly purified sample of the substance and under conditions excluding all wave lengths of light corresponding to the range of

light absorption of methylcholanthrene confirmed the former results. A striking feature is the growth-retarding effect in high dilutions and no evidence of growth stimulation has been observed. Since the ultimate purpose of this work is the attempted conversion of normal cells into cancer cells *in vitro* a thorough cytological study was made of the sarcomas induced in rats following intramuscular and subcutaneous injections of methylcholanthrene. Cultures of these sarcoma cells, as compared with normal fibroblasts, showed striking changes in the cell nucleus and marked changes in the cell membrane. These observations will furnish a valuable guide in the further study of the action of methylcholanthrene on normal cells in culture.

The fate of 1:2:5:6-dibenzanthracene, when injected subcutaneously or intravenously, was further investigated. During the preceding fiscal year determinations were made by spectrographic methods. Those studies failed to show any trace of the hydrocarbon when the 1:2:5:6-dibenzanthracene had been fed, which indicated either an absorption process or a biologically effected chemical change. In order further to investigate this finding, an extensive series of mouse feeding experiments was pursued. The spectroscopic analyses of organs and excreta gave the following results: The dibenzanthracene remains unchanged until it reaches the large intestine; there it disappears and a new spectroscopic band system appears in the ether extract of the feces and in the ether extract of the large intestine. This new band system is not dibenzanthracene, but it appears to be a hydrocarbon.

STUDIES ON THE PROPERTIES OF MALIGNANT TISSUES AND CANCER CELLS

Since one of the most outstanding characteristics of cancer cells is their apparently unrestrained multiplication, work was continued on the fundamental study of the chemistry of cell division, using *Amoeba proteus* as material. The main result obtained is the demonstration of the striking parallel between the controlling influence exercised by sulfhydryl and oxygen on enzymatic protein synthesis and its control of nuclear growth. The growth of the cell nucleus can be increased or decreased by altering the balance between sulfhydryl and oxygen in the environment. The rate of nuclear growth under these circumstances is closely correlated with the rate of cell division. These results seem to indicate that catheptic enzymes control nuclear growth, and thus control cell division, a clarification of the previously advocated concept of cell "maturity" as a prerequisite for cell division.

Studies on the proteolytic enzymes of cancerous tissues have been continued with emphasis upon their relationship to the proteins found in tumors. The globulin fraction was found to carry the proteolytic enzymes in contrast to the albumin fraction, which is only slightly proteolytic. Autolysis of the globulin fraction liberates an enzyme which hydrolyzes and synthesizes a tumor digest containing polypeptides and amino acids.

Since a swelling of cancer cells is one of the most marked changes following X-ray treatment of tumors, the osmotic behavior of cancer cells was further studied. The following conclusions were reached: (1) In protein-free salt solutions, increasing the salt content from below normal ("hypotonic") for mammalian serum to above normal

("hypertonic") did not restrain this swelling phenomenon. On the contrary, increasing the salt content promoted cell swelling. (2) A restraining effect, both as regards the number and size of the bulges, was obtained when the solutions contained serum protein. The greater the protein content, the greater was the restraining effect. (3) Even in the presence of protein, increasing the salt concentration from below normal ("hypotonic") to above normal ("hypertonic") did not restrain this swelling. On the contrary, increasing the salt content of a solution containing 6.4 percent serum protein promoted cell swelling. (4) This cell swelling could not be correlated with cell injury insofar as the cell injury was shown by the number and survival rate of viable cells.

The influence of the pituitary gland on cancerous growth has been studied. Preliminary results indicate that hypophysectomy in the rat retards the rate of growth of the Jensen sarcoma and Walker carcinoma under conditions of paired feeding and other suitable controls. A satisfactory technique for total hypophysectomy of the mouse was developed for the first time. This should prove very useful in further studies in this field.

The study of normal and cancer cells in tissue culture was continued. Observations made of rat fibroblasts confirmed previous results with *Amoeba proteus* in showing that the final stage in the cleavage of cytoplasm is accomplished by the two daughter cells dragging themselves away from each other through adhesion to some solid object. This clarifies the mechanism of this phase of cell division in mammalian tissue cells and explains the unsatisfactory proliferation of these cells when suspended in a fluid culture medium. The Walker rat carcinoma has been grown on an entirely foreign culture medium for twenty months. These cells frequently assumed forms which have been considered characteristic of sarcoma. A cytological study was made of the liver cancers induced by feeding aminoazotoluene to rats. This tumor has been successfully grown in tissue culture. Work is in progress on the cultivation of normal liver cells.

The ultracentrifuge has many possible uses in cancer research. A Beams type air driven machine has, therefore, been set up and is now in operation. Runs have been made with biological material at centrifugal forces of over 200,000 times gravity. A new system for speed determination and control has been devised.

THERAPEUTIC STUDIES

Investigation of the influence of diet on the growth rate of spontaneous breast cancer in mice was continued with particular reference to the amino acid methionine. A protein very low in this substance has been isolated in quantity from peanuts. Normal mice when placed on a diet in which this peanut protein furnishes the sole source of amino acids show very slight growth. The addition of cystine to this diet does not improve the growth-promoting properties, whereas methionine causes a rapid increase in weight. These diets are now being studied on tumor mice.

The effects of bacterial filtrates and colchicine on tumors were further investigated. An artificial culture medium for *B. prodigiosus*, containing only sugar, inorganic salts, and distilled water, was pre-

pared. Cultivation on this medium yields substances which invoke hemorrhages in transplanted sarcomas. The filtrates have been subjected to chemical fractionation with a view of purifying the active agents. It has been ascertained, furthermore, that bacterial filtrate and colchicine supplement each other in producing hemorrhages in transplanted mouse tumors. Also colchicine produces hemorrhages in certain tumors which are refractory to the filtrate, but after repeated animal passages these tumors became susceptible to the bacterial filtrate also.

A new series of synthetic organic sulfur compounds has been studied with regard to therapeutic properties on spontaneous breast cancer in mice. Suggestive results were obtained with some of these compounds.

In connection with a proposed investigation of some fundamental problems of the biological action of X-rays, a preliminary study was made of variations in the survival rate of *Drosophila* eggs. Fruit flies were obtained from other laboratories and were subjected to comparative studies concerning fertility and genetic difference.

MISCELLANEOUS

During the year seven Public Health Bulletins were issued, and three Bulletins were revised and reprinted. One hundred and three scientific articles were prepared for Public Health Reports and 23 for some other form of publication within the Service, while 195 articles were approved for outside publication.

DIVISION OF FOREIGN AND INSULAR QUARANTINE AND IMMIGRATION

Asst. Surg. Gen. C. L. WILLIAMS in charge

During the present fiscal year one case of smallpox arrived at the port of New York and one case of smallpox at Honolulu. Both cases were isolated at quarantine; no secondary cases developed. No other cases of quarantinable disease reached any United States port.

Cholera became epidemic in a number of Chinese cities, notably Shanghai and Hong Kong, and spread to Japanese ports, necessitating special examination, to exclude carriers, of passengers and crew from infected districts. Virulent smallpox became epidemic in Hong Kong but, from a quarantine viewpoint, was readily handled by requiring vaccination, before departure from that port, of all passengers and crew on ships clearing for United States ports. Since this is a port where the Public Health Service maintains a medical officer, little difficulty was encountered in applying this requirement.

The inauguration of air traffic between Hong Kong and Manila during the period of epidemic prevalence of cholera and smallpox brought to the fore the increased danger of spreading diseases by this rapid means of travel, since by air, persons traveling from Hong Kong reach Honolulu within the incubation period of cholera, and reach both Honolulu and San Francisco within the incubation period of smallpox. To meet this condition without material delay, air travelers were subjected to surveillance similar to the surveillance maintained over air travelers from South America.

Yellow fever in South America increased in prevalence and approached the large Brazilian cities of Sao Paulo and Rio de Janeiro. It was reported to be mainly of the jungle type, but occasional restricted human outbreaks in small communities were noted. Measures to prevent introduction of this disease by aircraft were further developed by completing immunization of aircraft operating personnel and by the establishment at Miami of a group of trained inspectors and other personnel for emergency control of *Aedes aegypti* mosquitoes. A moderate reserve supply of yellow fever vaccine became available and may be utilized immediately for immunization of persons in infected areas.

Typhus fever became epidemic in Morocco, with a relatively intense outbreak in Casablanca. No cases, however, were seen on ships from that port.

Except for the epidemics cited herein and except for a greater prevalence of cholera in Indochina and China, the quarantinable diseases occurred in the same areas and in about the same degree as heretofore.

Amendment No. 17 to the Quarantine Regulations was approved and put into force. It provides that cultures of disease bacteria, animals, and plants infected with human diseases and potential vectors of disease, not indigenous to the United States, may be imported only under permit from the Surgeon General.

The continued operation of radio pratique at New York and Boston has met with widespread approval and has saved a tremendous aggregate of time for passenger vessels. During the year, radio pratique for vessels complying with the prescribed conditions was extended to the ports of San Francisco and Los Angeles.

Concentration of expert personnel at central stations for duty over wide areas has progressed and has operated very well, even though all stations could not be fully supplied with automotive equipment, a deficiency which will be met during the ensuing year.

New construction at the various quarantine stations consisted of the completion of a new station at Jacksonville, Fla., and progress on construction of a new detention hospital and detention compound at Honolulu. A site was acquired from the Army for relocation of the station at Galveston, Tex.

Two 40-foot gasoline launches and one 35-foot gasoline launch were added to the floating equipment of the quarantine service to replace boats that had become unserviceable.

Due to unsettled conditions in Europe, the volume of applications for immigration visas became so great during the year that the State Department requested additional medical officers to provide for full-time medical examinations at four consulates where the function had previously been on a half-time basis. This has necessitated the detail of two additional officers to duty in Europe.

Condensed statistical information showing the quarantine and immigration activities for the year is presented in the appended tables.

TRANSACTIONS AT MARITIME STATIONS

TABLE 1.—*Summary of transactions at maritime stations for the fiscal year 1938*

Station	Vessels inspected	Vessels granted free pratique	Vessels fumigated		Deratization exemption certificates issued	Passengers inspected	Crew inspected	Bills of health and port sanitary statements issued	Amount of bills rendered for quarantine services
			Cyanide	Sulphur					
Aberdeen, Wash.	9	9	0	0	0	0	321	278	\$115.00
Astoria, Oreg.	52	33	6	0	0	29	1,873	1,364	703.28
Baltimore, Md.	677	640	52	0	244	163	22,683	5,996	12,491.59
Beaufort, S. C.	0	0	0	0	0	0	0	0	0
Boca Grande, Fla.	15	14	0	0	0	15	495	0	225.00
Boston, Mass.	807	691	83	0	70	38,056	62,479	1,052	14,835.92
Brunswick, Ga.	2	2	0	0	0	0	128	86	10.00
Carrabelle, Fla. (St. Georges Sound)	6	6	0	0	0	0	64	0	30.00
Charleston, S. C.	175	161	12	0	11	843	7,323	240	2,674.47
Corpus Christi, Tex. ¹	205	205	1	0	3	14	6,965	854	2,334.56
Eastport, Maine	2	1	0	0	0	0	35	4	20.00
Eureka, Calif.	2	2	0	0	0	1	66	23	20.00
Fall River, Mass.	2	2	0	0	0	0	63	34	20.00
Fernandina, Fla. (Cumberland Sound)	4	4	0	0	0	0	138	26	40.00
Fort Lauderdale, Fla. (Port Everglades)	25	25	0	0	0	31	993	0	255.00
Fort Monroe, Va.	405	391	22	11	45	6,486	29,813	1,044	5,243.11
Freeport, Tex.	15	14	0	0	0	3	543	0	150.00
Galveston, Tex.	1,018	996	14	0	129	600	36,050	4,384	12,972.85
Georgetown, S. C.	4	2	0	0	0	20	157	4	40.00
Gulfport, Miss.	15	15	0	0	0	5	502	114	150.00
Jacksonville, Fla. (St. Johns River)	226	203	18	0	19	59	5,352	761	2,922.22
Key West, Fla.	33	23	0	0	12	49	554	19	305.00

¹ Includes Ingleside and Port Aransas, Tex.

TRANSACTIONS AT MARITIME STATIONS—continued

TABLE 1.—Summary of transactions at maritime stations for the fiscal year 1938—Continued

Station	Vessels inspected	Vessels granted free pratique	Vessels fumigated		Deratization exemption certificates issued	Passengers inspected	Crew inspected	Bills of health and port sanitary state ments issued	Amount of bills rendered for quarantine services
			Cyanide	Sulphur					
Los Angeles, Calif.	1,433	869	29	0	249	27,858	75,242	6,291	\$24,071.56
Marshfield, Oreg. (Coos Bay)	17	17	0	0	3	0	693	75	200.00
Miami, Fla.	79	73	4	0	39	6,531	7,472	757	1,380.72
Mobile, Ala.	312	273	18	0	68	258	10,323	711	4,716.98
New Bedford, Mass.	4	4	0	0	0	115	108	5	20.00
New London, Conn.	10	10	0	0	0	23	269	28	75.00
New Orleans, La.	1,464	1,372	38	0	196	12,599	55,623	5,600	21,150.21
Newport, R. I.	6	6	0	0	0	21	725	18	55.00
New York, N. Y. ²	3,453	1,063	178	0	564	522,853	556,107	17,134	49,501.86
Ogdensburg, N. Y.	0	0	0	0	0	0	0	0	0
Panama City, Fla. (St. Andrews)	11	11	0	0	0	17	446	456	135.00
Pensacola, Fla.	43	25	5	0	6	30	1,285	602	723.51
Philadelphia, Pa. (Marcus Hook)	661	545	48	0	156	1,233	25,878	4,614	11,932.19
Plymouth, Mass.	0	0	0	0	0	0	0	0	0
Port Isabel, Tex.	6	6	0	0	0	0	259	0	75.00
Portland, Maine	97	88	1	0	15	117	3,080	77	1,160.91
Portland, Oreg.	14	12	10	0	16	33	577	2,286	1,462.72
Port Townsend, Wash. ³	60	51	29	0	39	8	1,982	2,417	3,636.44
Providence, R. I.	27	20	0	0	6	0	808	68	330.00
Sabine, Tex.	503	494	4	0	55	98	17,088	0	5,127.12
San Diego, Calif. (Point Loma)	219	151	2	0	45	701	4,579	788	2,104.74
San Francisco, Calif. (Angel Island)	492	368	19	0	116	24,134	32,604	0	9,098.57
San Luis Obispo, Calif. (Port San Luis)	82	82	0	0	26	7	2,997	0	1,695.00
Savannah, Ga.	124	113	2	0	6	88	3,672	966	1,547.21
Searsport, Maine	6	6	0	0	0	0	127	0	60.00
South Bend, Wash.	6	6	0	0	2	0	212	29	60.00
Tampa, Fla.	243	207	14	0	32	385	5,952	1,520	2,710.89
Vineyard Haven, Mass.	0	0	0	0	0	0	0	0	0
West Palm Beach, Fla.	1	1	0	0	0	0	23	0	5.00
Wilmington, N. C.	42	39	1	0	0	25	1,278	0	510.00
Total	13,114	9,351	610	11	2,172	643,508	986,006	60,725	199,103.63
Alaska:									
Ketchikan	0	0	0	0	0	0	0	0	0
Wrangell	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0
Hawaii:									
Ahukini	1	1	0	0	0	0	38	62	15.00
Hilo	7	6	0	0	0	0	125	229	55.00
Honolulu	161	153	18	0	9	41,836	42,316	853	5,095.60
Kahului	0	0	0	0	0	0	0	186	0
Lahaina	0	0	0	0	0	0	0	59	0
Mahukona	0	0	0	0	0	0	0	48	0
Port Allen	2	2	0	0	0	0	148	99	15.00
Total	171	162	18	0	9	41,836	42,627	1,536	5,180.60
Philippine Islands:									
Aparri	24	0	0	0	0	62	538	23	0
Cebu	107	1	2	101	5	255	5,769	460	0
Davao	88	3	0	0	0	797	4,213	106	0
Iloilo	114	2	0	60	1	106	4,602	216	0
Jolo	21	0	0	0	0	674	806	26	0
Jose Pañganiban	88	0	0	0	0	52	3,800	116	0
Legaspi	18	0	0	0	1	2	584	51	0
Manila	1,111	189	43	121	18	90,856	114,468	1,267	0
Olongapo	0	0	0	0	0	0	0	0	0
Zamboanga	62	0	0	32	0	675	2,321	92	0
Total	1,633	195	45	314	25	93,479	137,101	2,357	0

¹Includes Perth Amboy, N. J.²Includes all ports on Puget Sound.

TRANSACTIONS AT MARITIME STATIONS—continued

TABLE 1.—Summary of transactions at maritime stations for the fiscal year 1938—Continued

Station	Vessels inspected	Vessels granted free pratique	Vessels fumigated		Deratization exemption certificates issued	Passengers inspected	Crew inspected	Bills of health and port sanitary statements issued	Amount of bills rendered for quarantine services
			Cyanide	Sulphur					
Puerto Rico:									
Aguadilla.....	5	5	0	0	0	3	126	93	\$32.00
Arecibo.....	2	2	0	0	0	8	98	58	30.00
Arroyo.....	1	1	0	0	0	0	37	62	10.00
Central Aguirre.....	3	3	0	0	0	62	245	63	40.00
Fajardo.....	0	0	0	0	0	0	0	296	0
Guanica.....	27	27	0	1	1	139	670	46	185.00
Humacao.....	3	2	0	0	0	0	27	57	10.00
Mayaguez.....	25	23	0	0	0	2	260	208	145.00
Ponce.....	72	69	0	0	4	184	1,578	390	465.00
San Juan.....	349	333	4	0	36	4,266	8,851	810	4,132.97
Total.....	487	465	4	1	41	4,664	11,892	2,083	5,049.97
Virgin Islands:									
Charlotte Amalie.....	416	344	0	1	12	3,796	16,196	943	5,332.36
Christiansted.....	11	11	0	0	0	32	93	291	65.00
Frederiksted.....	41	41	0	0	0	2,276	2,773	114	522.00
Total.....	468	396	0	1	12	6,104	19,062	1,348	5,919.36
Total, all stations.....	15,873	10,569	677	327	2,259	789,591	1,196,688	68,049	\$215,253.56

TABLE 2.—Statement of quarantine services rendered at maritime quarantine stations during the fiscal year 1938

Station	Inspection services	Detention services	Special services	Fumigation services	Total charges
Aberdeen, Wash.....	\$115.00	0	0	0	\$115.00
Astoria, Oreg.....	520.00	0	0	\$183.28	703.28
Baltimore, Md.....	7,110.00	0	\$2,440.00	2,941.59	12,491.59
Beaufort, S. C.....	0	0	0	0	0
Boca Grande, Fla.....	225.00	0	0	0	225.00
Boston, Mass.....	8,336.00	0	680.00	5,819.92	14,835.92
Brunswick, Ga.....	10.00	0	0	0	10.00
Carrabelle, Fla. (St. Georges Sound).....	30.00	0	0	0	30.00
Charleston, S. C.....	1,935.00	0	110.00	579.47	2,674.47
Corpus Christi, Tex. ¹	2,334.56	0	0	0	2,334.56
Eastport, Maine.....	20.00	0	0	0	20.00
Eureka, Cal.....	20.00	0	0	0	20.00
Fall River, Mass.....	20.00	0	0	0	20.00
Fernandina, Fla. (Cumberland Sound).....	40.00	0	0	0	40.00
Fort Lauderdale, Fla. (Port Everglades).....	255.00	0	0	0	255.00
Fort Monroe, Va.....	3,850.00	0	420.00	973.11	5,243.11
Freeport, Tex.....	150.00	0	0	0	150.00
Galveston, Tex.....	10,895.00	0	1,290.00	787.85	12,972.85
Georgetown, S. C.....	40.00	0	0	0	40.00
Gulfport, Miss.....	150.00	0	0	0	150.00
Jacksonville, Fla. (St. Johns River).....	1,920.00	0	180.00	822.22	2,922.22
Key West, Fla.....	205.00	0	100.00	0	305.00
Los Angeles, Calif.....	18,834.00	0	2,490.00	2,697.56	24,071.56
Marshfield, Oreg. (Coos Bay).....	200.00	0	0	0	200.00
Miami, Fla.....	811.00	0	390.00	179.72	1,380.72
Mobile, Ala.....	3,260.00	0	680.00	776.98	4,716.98
New Bedford, Mass.....	20.00	0	0	0	20.00
New London, Conn.....	75.00	0	0	0	75.00
New Orleans, La.....	16,080.00	0	2,102.50	2,967.71	21,150.21
Newport, R. I.....	55.00	0	0	0	55.00
New York, N. Y. ²	29,811.00	0	5,830.00	13,860.86	49,501.86
Ogdensburg, N. Y.....	0	0	0	0	0
Panama City, Fla.....	135.00	0	0	0	135.00

¹ Includes Port Aransas and Ingleside, Tex.² Includes Perth Amboy, N. J..

TRANSACTIONS AT MARITIME STATIONS—continued

TABLE 2.—Statement of quarantine services rendered at maritime quarantine stations during the fiscal year 1938—Continued

Station	Inspection services	Detention services	Special services	Fumigation services	Total charges
Pensacola, Fla.....	\$375.00	0	\$60.00	\$288.51	\$723.51
Philadelphia, Pa. (Marcus Hook).....	7,461.00	0	1,560.00	2,911.19	11,932.19
Plymouth, Mass.....	0	0	0	0	0
Port Isabel, Tex.....	75.00	0	0	0	75.00
Portland, Maine.....	980.00	0	160.00	20.91	1,160.91
Portland, Oreg.....	140.00	0	185.00	1,137.72	1,462.72
Port Townsend, Wash. ³	600.00	0	400.00	2,636.44	3,636.44
Providence, R. I.....	270.00	0	60.00	0	330.00
Sabine, Tex.....	4,470.00	0	550.00	107.12	5,127.12
San Diego, Calif. (Point Loma).....	1,470.00	0	450.00	184.74	2,104.74
San Francisco, Calif. (Angel Island).....	6,538.00	\$90.00	1,110.00	1,360.57	9,098.57
San Luis Obispo, Calif. (Port San Luis).....	1,435.00	0	260.00	0	1,695.00
Savannah, Ga.....	1,345.00	0	71.25	130.96	1,547.21
Searsport, Maine.....	60.00	0	0	0	60.00
South Bend, Wash.....	60.00	0	0	0	60.00
Tampa, Fla.....	2,065.00	0	320.00	325.89	2,710.89
Vineyard Haven, Mass.....	0	0	0	0	0
West Palm Beach, Fla.....	5.00	0	0	0	5.00
Wilmington, N. C.....	510.00	0	0	0	510.00
Total.....	135,420.56	90.00	21,898.75	41,694.32	199,103.63
Alaska:					
Ketchikan.....	0	0	0	0	0
Wrangell.....	0	0	0	0	0
Total.....	0	0	0	0	0
Hawaii:					
Ahukini.....	15.00	0	0	0	15.00
Hilo.....	55.00	0	0	0	55.00
Honolulu.....	3,975.00	756.00	149.00	215.60	5,095.60
Kahului.....	0	0	0	0	0
Lahaina.....	0	0	0	0	0
Mahukona.....	0	0	0	0	0
Port Allen.....	15.00	0	0	0	15.00
Total.....	4,060.00	756.00	149.00	215.60	5,180.60
Puerto Rico:					
Aguadilla.....	32.00	0	0	0	32.00
Arecibo.....	30.00	0	0	0	30.00
Arroyo.....	10.00	0	0	0	10.00
Central Aguirre.....	40.00	0	0	0	40.00
Fajardo.....	0	0	0	0	0
Guanica.....	180.00	0	0	5.00	185.00
Humacao.....	10.00	0	0	0	10.00
Mayaguez.....	145.00	0	0	0	145.00
Ponce.....	465.00	0	0	0	465.00
San Juan.....	3,889.00	0	170.00	73.97	4,132.97
Total.....	4,801.00	0	170.00	78.97	5,049.97
Virgin Islands:					
Charlotte Amalie.....	5,318.00	0	10.00	4.36	5,332.36
Christiansted.....	65.00	0	0	0	65.00
Frederiksted.....	522.00	0	0	0	522.00
Total.....	5,905.00	0	10.00	4.36	5,919.36
Total, all stations.....	\$150,186.56	\$846.00	\$22,227.75	\$41,993.25	\$215,253.56

³ Includes all ports on Puget Sound.

MEXICAN BORDER STATIONS

TABLE 3.—Summary of quarantine transactions on the Mexican border for the fiscal year 1938

Station	Number of persons from interior of Mexico inspected	Number of local persons inspected	Total number of persons inspected	Total number of persons disinfected	Total number of persons passed without treatment	Total number of persons vaccinated	Total number of sick refused admission	Total pieces of baggage disinfected
Brownsville, Tex.....	9,729	829,840	839,569	0	839,184	385	0	0
Calexico, Calif.....	0	28,166	28,166	0	27,096	1,070	0	0
Columbus, N. Mex.....	217	834	1,051	0	787	262	2	0
Del Rio, Tex.....	1,249	85,006	86,255	116	85,241	896	2	19
Douglas, Ariz.....	87	701	788	0	702	47	39	0
Eagle Pass, Tex.....	17,793	498,086	515,879	1	514,606	1,272	0	38
El Paso, Tex. ¹	12,706	6,065,169	6,077,875	1,866	6,071,046	4,938	25	377
Hidalgo, Tex.....	4,847	351,695	356,542	1	354,084	2,456	1	0
Laredo, Tex. ²	165,751	1,638,446	1,804,197	87	1,802,978	1,132	0	64
Naco, Ariz.....	15	2,690	2,705	0	2,256	449	0	0
Nogales, Ariz.....	6,545	2,194	8,739	210	8,364	160	5	0
Presidio, Tex.....	1,854	66,895	68,749	124	66,535	2,090	0	0
Rio Grande City, Tex.....	254	8,227	8,481	0	8,248	233	0	0
Roma, Tex.....	1,511	55,707	57,218	0	56,591	627	0	28
San Ysidro, Calif.....	2,280	4,905	7,185	0	6,299	886	0	0
Thayer (Mercedes), Tex.....	40	49,320	49,360	5	49,075	280	0	0
Zapata, Tex.....	3	15,171	15,174	0	14,908	266	0	0
Total.....	224,881	9,703,052	9,927,933	2,410	9,908,000	17,449	74	526

¹ Includes Fort Hancock, Guadalupe Gate, and Ysleta.² Includes Minera and San Ignacio.

TRANSACTIONS AT UNITED STATES AIRPORTS OF ENTRY FOR AIRPLANES FROM FOREIGN PORTS

TABLE 4.—Summary of transactions at continental and insular stations for the fiscal year 1938

Location	Name of airport	Distance in miles to nearest Public Health Service station	Date designated	Number of airplanes arriving from foreign ports	Number of airplanes inspected by Public Health Service	Number of persons arriving from foreign ports or places	Number of persons inspected by Public Health Service	Number of aliens inspected by Public Health Service	Number of aliens certified for disease
Ajo, Ariz.	Municipal Airport.	6	Nov. 15, 1929	1	0	3	0	0	0
Akron, Ohio ¹	Municipal Airport.		Apr. 8, 1929	49	49	784	784	23	1
Alameda, Calif.	Alameda Seaplane Base ²								
Albany, N. Y.	Municipal Field.	10	Sept. 28, 1928	68	68	986	986	232	1
Baltimore, Md.	Baltimore Airport.	20	June 26, 1936						
Bangor, Maine ¹	Bangor Municipal Airport.		Apr. 18, 1931	0	0	0	0	0	0
Bellingham, Wash.	Graham Airport.	5	Jan. 8, 1930	424	424	4,492	4,492	691	11
Brownsville, Tex.	Municipal Airport.		June 10, 1929						
Buffalo, N. Y.	do.		July 29, 1933	0	0	0	0	0	0
Burlington, Vt. ¹	Buffalo Marine Airport.		June 29, 1934						
Calcutta, Calif.	Burlington Municipal Airport.		Jan. 29, 1933	0	0	0	0	0	0
Calexico, Calif.	Calexico Municipal Airport.		June 18, 1931						
Cape Vincent, N. Y.	Cape Vincent Harbor.		Apr. 25, 1934						
Caribou, Maine ¹	Caribou Municipal Airport.		Oct. 31, 1932	54	54	481	481	0	0
Charlotte Amalie, V. I.	Charlotte Amalie Airport.			0	0	0	0	0	0
Cleveland, Ohio	Cleveland Municipal Airport.		Sept. 23, 1932						
Crosby, N. Dak. ¹	Crosby Municipal Airport.		June 28, 1934						
Detroit, Mich.	Detroit Municipal Airport.	5	June 19, 1931	145	0	298	0	0	0
Douglas, Ariz.	Ford Airport.	15	Aug. 1, 1929						
Duluth, Minn.	Wayne County Airport.		Feb. 10, 1931	0	0	0	0	0	0
Duluth, Minn.	Douglas Airport.		Jan. 8, 1930	4	0	8	0	0	0
Duluth, Minn.	Duluth Municipal Airport.		Sept. 4, 1931						
Duluth, Minn.	Duluth Boat Club Seaplane Base		do.						
Eagle Pass, Tex.	Eagle Pass Airport.	1½	Mar. 5, 1930	1	1	2	2	0	0
El Paso, Tex.	Municipal Airport.	9	Aug. 23, 1932	32	32	86	86	77	0
Fairbanks, Alaska ¹	Weeks Municipal Airfield.		Apr. 1, 1935	153	153	1,238	1,238	0	0
Glendale, Calif.	Grand Central Air Terminal.								
Great Falls, Mont. ¹	Great Falls Municipal Airport.	12	June 2, 1930	0	0	0	0	0	0
Havre, Mont.	Havre Municipal Airport.		do.	49	49	808	808	20	0
Honolulu, T. H.	Honolulu Airport.		June 18, 1930	0	0	0	0	0	0
Juneau, Alaska.	Juneau Airport.	8	do.	0	0	0	0	0	0
Ketchikan, Alaska.	Ketchikan Airport.		Dec. 20, 1927	1	1	1	1	0	0
Key West, Fla.	Meacham Field.	4	Jan. 24, 1930	41	41	128	128	0	0
Laredo, Tex.	Laredo Airplane.	3½	Apr. 18, 1930	2	0	4	0	0	0
Malone, N. Y.	Malone Airport.								

Footnotes at end of table.

TRANSACTIONS AT UNITED STATES AIRPORTS OF ENTRY FOR AIRPLANES FROM FOREIGN PORTS—Continued

TABLE 4.—Summary of transactions at continental and insular stations for the fiscal year 1938—Continued

Location	Name of airport	Distance in miles to nearest Public Health Service station	Date designated	Number of airplanes arriving from foreign ports	Number of airplanes inspected by Public Health Service	Number of persons arriving from foreign ports or places	Number of persons inspected by Public Health Service	Number of aliens certified for disease
Miami, Fla.	{ Pan American Field. Dinner Key Seaplane Base. Chalks Flying Service Airport ¹ .	14 11	Oct. 16, 1938 Mar. 7, 1930 Sept. 17, 1937	1,244	366	30,300	6,424	11
Nogales, Ariz.	Nogales Municipal Airport.	7	June 27, 1929	18	18	42	42	0
Ogdensburg, N. Y.	Ogdensburg Harbor.		Mar. 1, 1932	0	0	0	0	0
Pembina, N. Dak.	Port Pembina Airport.	5	Feb. 2, 1930	563	0	2,322	0	0
Plattsburg, N. Y.	Plattsburg Municipal Airport ² .		June 2, 1930					
Portail, N. Dak.	Portail Airport.	62	Jan. 8, 1930	0	0	0	0	0
Port Angeles, Wash.	Port Angeles Airport.		do.	0	0	0	0	0
Port Townsend, Wash.	Port Townsend Airport.	6	June 18, 1930	0	0	0	0	0
Port Washington, N. Y.	Port Washington Airport ³ .			117	117	1,954	1,954	1
Put-in-Bay, Ohio ¹ .	Put-in-Bay Airport.		Mar. 12, 1934					
Rochester, N. Y.	Rochester Municipal Airport ² .		Nov. 7, 1936	0	0	0	0	0
Rouses Point, N. Y.	Rouses Point Seaplane Base.		July 14, 1932	0	0	0	0	0
San Diego, Calif.	San Diego Municipal Airport.	6	Jan. 24, 1930	103	1	289	6	2
Sandusky, Ohio.	Sandusky Municipal Airport ¹ .		June 1, 1937	0	0	0	0	0
Sault Ste. Marie, Mich.	Sault Ste. Marie Airport ² .		Jan. 19, 1929	454	401	5,778	5,709	3
Seattle, Wash.	{ Boeing Municipal Air Field. Lake Union.		Aug. 4, 1933 Sept. 11, 1928	0 786	0 0	3,610	0	0
Skagway, Alaska ¹ .	Skagway Municipal Airport.		Dec. 27, 1928					
Spokane, Wash. ¹ .	Spokane Municipal Airport.		Nov. 30, 1931					
Swanton, Vt. ¹ .	Swanton Municipal Airport.		June 2, 1931					
Tampa, Fla.	International Airport ² .	7	July 18, 1930	0	0	0	0	0
Warroad, Minn. ¹ .	Warroad Seaplane Base ² .		Dec. 1, 1933					
Watertown, N. Y. ¹ .	Watertown Municipal Airport ² .		Sept. 2, 1937					
Wellesley Island, N. Y. ¹ .	{ Wellesley Farms Airport ² . Wellesley Island Seaplane Base ² .		June 2, 1930 May 1, 1938					
West Palm Beach, Fla.	Roosevelt Flying Service Base.		Mar. 10, 1931	9	9	31	31	0
Wrangell, Alaska.	Wrangell Seaplane Base.		Nov. 30, 1931					
Total				4,323	1,784	53,645	23,172	28

¹ No medical officer of Public Health Service on duty.² Temporary permission.³ Authorized for use but not officially designated.

CANAL ZONE

TABLE 5.—*Quarantine activities of the Government of the Canal Zone during the fiscal year 1938 **

Activities	Balboa	Cristobal	Total
Vessels boarded and passed.....	2,864	3,622	6,486
Vessels granted pratique by radio.....	48	74	122
Total number of vessels passed.....	2,912	3,696	6,608
Crew passed at quarantine.....	139,678	229,277	368,955
Crew passed by radio.....	7,684	22,067	29,751
Total number of crew passed.....	147,362	251,344	398,706
Passengers passed at quarantine.....	44,624	103,432	148,056
Passengers passed by radio.....	3,458	2,359	5,817
Total number of passengers passed.....	48,082	105,791	153,873
Supplementary sanitary inspections of vessels.....	1,140	2,534	3,674
Vessels fumigated with HCN gas.....	14	50	64
Box cars fumigated with HCN gas.....	93	162	255
Fumigation certificates issued to vessels.....	14	50	64
Deratization exemption certificates issued.....	19	11	30
Rodents recovered after fumigation.....	144	178	322
Airplanes inspected and passed.....	335	309	644
Crew of airplanes inspected and passed.....	1,291	1,461	2,752
Passengers of airplanes inspected and passed.....	2,306	1,716	4,022
Vessels detained in quarantine.....	0	0	0
Crew detained on board ship for quarantine.....	0	0	0

*Surgeon O. E. Denney, U. S. Public Health Service, detailed as chief quarantine officer.

MEDICAL INSPECTION OF ALIENS

TABLE 6.—*Alien passengers and seamen inspected and certified at maritime ports in the United States and possessions during the fiscal year 1938*

Place	Number of alien passengers ex- amined	Alien passengers certified ¹					Number of alien seamen ex- amined	Alien seamen certified ¹				
		Class A		Class B	Class C	Total		Class A		Class B	Class C	Total
		I	II					I	II			
ATLANTIC COAST												
Baltimore, Md.-----	151	0	0	0	0	0	15,890	0	33	12	0	45
Beaufort, S. C.-----	0	0	0	0	0	0	0	0	0	0	0	0
Boston, Mass.-----	6,232	12	3	695	0	710	57,470	1	65	83	0	149
Brunswick, Ga.-----	0	0	0	0	0	0	128	0	0	0	0	0
Charleston, S. C.-----	66	0	0	0	0	0	3,723	2	5	3	6	16
Fall River, Mass.-----	0	0	0	0	0	0	31	0	0	0	0	0
Fernandina, Fla. (Cumber- land Sound)-----	0	0	0	0	0	0	32	0	0	0	0	0
Fort Lauderdale, Fla. (Port Everglades)-----	25	0	0	0	0	0	894	5	0	0	0	5
Fort Monroe, Va.*-----	358	0	0	6	0	6	9,960	0	35	0	0	35
Fort Pierce, Fla.-----	0	0	0	0	0	0	0	0	0	0	0	0
Georgetown, S. C.-----	0	0	0	0	0	0	0	0	0	0	0	0
Gloucester, Mass.-----	0	0	0	0	0	0	417	1	0	0	0	1
Jacksonville, Fla.-----	17	0	0	0	0	0	3,412	0	2	0	0	2
Key West, Fla.-----	1,513	0	0	18	0	18	245	0	0	0	0	0
Lewes, Del.-----	0	0	0	0	0	0	2	0	0	0	0	0
Miami, Fla.-----	21,600	4	8	65	6	83	6,905	0	1	0	0	1
New Bedford, Mass.-----	11	0	0	0	0	0	4	0	0	0	0	0
New London, Conn.-----	0	0	0	0	0	0	0	0	0	0	0	0
Newport R. I.-----	0	0	0	0	0	0	0	0	0	0	0	0
New York, N. Y. (Ellis Island)-----	167,133	37	72	11,262	67	11,438	450,923	9	332	10	32	383
Perth Amboy, N. J.-----	1	0	0	0	0	0	772	0	3	0	0	3
Philadelphia, Pa.-----	248	0	0	1	0	1	19,226	51	0	0	5	56
Plymouth, Mass.-----	0	0	0	0	0	0	0	0	0	0	0	0

¹ Class A-I: Aliens certified for idiocy, imbecility, feeble-mindedness, insanity, epilepsy, chronic alcoholism. Class A-II: Aliens certified for tuberculosis or other loathsome or dangerous contagious disease. Class B: Aliens certified for diseases or defects which affect ability to earn a living. Class C: Aliens certified for diseases or defects of less degree.

* Includes Norfolk, Va., and Newport News, Va.

MEDICAL INSPECTION OF ALIENS—continued

TABLE 6.—*Alien passengers and seamen inspected and certified at maritime ports in the United States and possessions during the fiscal year 1938—Continued*

Place	Number of alien passengers examined	Alien passengers certified					Number of alien seamen examined	Alien seamen certified				
		Class A		Class B	Class C	Total		Class A		Class B	Class C	Total
		I	II					I	II			
ATLANTIC COAST—Contd.												
Portland, Maine.....	108	0	0	0	0	0	2,506	0	4	0	0	4
Providence, R. I.....	1	0	0	0	0	0	761	0	1	0	2	3
Savannah, Ga.....	45	0	0	0	0	0	2,662	16	0	1	2	19
Searsport, Maine.....	0	0	0	0	0	0	127	0	0	0	1	1
Vineyard Haven, Mass.....	0	0	0	0	0	0	0	0	0	0	0	0
Washington, N. C.....	0	0	0	0	0	0	0	0	0	0	0	0
West Palm Beach, Fla.....	70	0	0	0	0	0	314	0	0	0	0	0
Wilmington, N. C.....	20	0	0	0	0	0	1,070	0	0	0	0	0
Total.....	197,599	53	83	12,047	73	12,256	577,474	85	481	109	48	723
GULF COAST												
Atchafalaya, La. (Morgan City).....	0	0	0	0	0	0	0	0	0	0	0	0
Boca Grande, Fla.....	3	0	0	0	0	0	190	0	0	0	0	0
Brownsville, Tex.....	0	0	0	0	0	0	198	0	1	0	0	1
Carrabelle, Fla.....	0	0	0	0	0	0	0	0	0	0	0	0
Corpus Christi, Tex.....	9	0	0	0	0	0	5,598	0	0	0	0	0
Freeport, Tex.....	2	0	0	0	0	0	508	0	1	1	0	2
Galveston, Tex.....	131	0	0	0	0	0	26,242	2	59	14	0	75
Gulfport, Miss.....	0	0	0	0	0	0	0	0	0	0	0	0
Mobile, Ala.....	106	0	0	0	0	0	6,466	0	4	0	0	4
New Orleans, La.....	1,760	1	0	20	4	25	31,817	2	125	43	35	205
Panama City, Fla.....	11	0	0	0	0	0	265	0	0	0	0	0
Pascagoula, Miss.....	0	0	0	0	0	0	0	0	0	0	0	0
Pensacola, Fla.....	13	0	0	0	0	0	867	0	3	0	0	3
Port Aransas, Tex.....	0	0	0	0	0	0	705	0	0	0	0	0
Port St. Joe, Fla.....	0	0	0	0	0	0	49	0	0	0	0	0
Sabine, Tex.....	20	0	0	0	0	0	14,074	3	21	0	0	24
Tampa, Fla.....	171	0	0	0	0	0	3,141	0	7	0	0	7
Total.....	2,226	1	0	20	4	25	90,120	7	221	58	35	321
PACIFIC COAST												
Aberdeen, Wash.....	0	0	0	0	0	0	321	0	0	0	0	0
Astoria, Oreg.....	30	0	0	0	0	0	1,839	0	19	4	0	23
Eureka, Calif.....	0	0	0	0	0	0	0	0	0	0	0	0
Fort Bragg, Calif.....	0	0	0	0	0	0	0	0	0	0	0	0
Los Angeles, Calif.....	5,659	0	4	154	1	159	54,399	5	142	7	4	158
Marshfield, Oreg. (Coos Bay).....	0	0	0	0	0	0	693	0	5	0	0	5
Monterey, Calif.....	0	0	0	0	0	0	0	0	0	0	0	0
Portland, Oreg.....	14	0	0	3	0	3	493	0	5	1	0	6
San Diego, Calif.....	502	1	3	2	0	6	3,221	0	2	0	0	2
San Francisco, Calif. (Angel Island).....	6,370	0	7	544	39	590	11,596	0	28	3	0	31
San Luis Obispo, Calif.....	5	0	0	0	0	0	2,694	0	14	8	4	26
Santa Barbara, Calif.....	0	0	0	0	0	0	0	0	0	0	0	0
Seattle, Wash.....	3,241	0	4	26	9	39	8,210	0	5	1	0	6
South Bend, Wash.....	0	0	0	0	0	0	212	0	0	0	0	0
Total.....	15,821	1	18	729	49	797	83,678	5	220	24	8	257
INSULAR												
Alaska:												
Ketchikan.....	0	0	0	0	0	0	0	0	0	0	0	0
Hawaii:												
Honolulu.....	4,082	0	11	10	0	21	32,395	0	9	6	1	16
Philippine Islands:												
Aparri.....	5	0	0	0	0	0	0	0	0	0	0	0
Davao.....	172	0	0	0	0	0	0	0	0	0	0	0
Iloilo.....	3	0	0	0	0	0	0	0	0	0	0	0
Jolo.....	385	0	0	0	0	0	0	0	0	0	0	0
Legaspi.....	0	0	0	0	0	0	0	0	0	0	0	0

¹ Includes all ports on Puget Sound.

MEDICAL INSPECTION OF ALIENS—continued

TABLE 6.—*Alien passengers and seamen inspected and certified at maritime ports in the United States and possessions during the fiscal year 1938—Continued*

Place	Number of alien passengers examined	Alien passengers certified					Number of alien seamen examined	Alien seamen certified				
		Class A		Class B	Class C	Total		Class A		Class B	Class C	Total
		I	II					I	II			
INSULAR—continued												
Philippine Islands—Con.												
Manila.....	30,374	0	26	29	0	55	39	0	0	0	0	0
Zamboanga.....	5	0	0	0	0	0	0	0	0	0	0	0
Total.....	30,944	0	26	29	0	55	39	0	0	0	0	0
Puerto Rico:												
Aguadilla.....	3	0	0	0	0	0	126	0	0	0	0	0
Arecibo.....	5	0	0	0	0	0	41	0	0	0	0	0
Arroyo.....	0	0	0	0	0	0	7	0	0	0	0	0
Central Aguirre (Jobos).....	10	0	0	0	0	0	38	0	0	0	0	0
Fajardo.....	3	0	0	0	0	0	269	0	0	0	0	0
Guánica.....	21	0	0	0	0	0	385	0	1	0	0	1
Humacao.....	0	0	0	0	0	0	22	0	0	0	0	0
Mayaguez.....	0	0	0	0	0	0	222	0	1	0	0	1
Ponce.....	48	0	0	0	0	0	491	0	0	0	0	0
San Juan.....	4,340	1	1	13	0	15	7,115	0	19	2	0	21
Total.....	4,430	1	1	13	0	15	8,716	0	21	2	0	23
Total, all stations.....	255,102	56	139	12,848	126	13,169	792,422	97	952	199	92	1,340

TABLE 7.—*Aliens inspected and certified at international border stations during the fiscal year 1938*

Place	Number of persons making permanent entry examined	Number of persons making temporary entry examined	Other persons examined	Total number of persons examined	Aliens certified				
					Total	Class A		Class B	Class C
						I	II		
MEXICAN BORDER									
Ajo, Ariz.....	0	0	166	166	0	0	0	0	0
Brownsville, Tex.....	418	540	206	1,164	116	7	13	49	47
Calexico, Calif.....	476	132	27,559	28,167	116	7	12	97	0
Columbus, N. Mex.....	0	0	1,051	1,051	0	0	0	0	0
Del Rio, Tex.....	32	0	9,892	9,924	18	0	1	5	12
Douglas, Ariz.....	87	14	783	884	58	5	20	13	20
Eagle Pass, Tex.....	155	20	11,659	11,834	47	13	2	23	9
El Paso, Tex. ¹	766	667	12,410	13,843	1,099	52	210	819	18
Hidalgo, Tex.....	144	0	337	481	73	5	14	31	23
Laredo, Tex.....	1,544	2,304	85,690	89,538	176	9	15	147	5
Naco, Ariz.....	12	3	2,690	2,705	213	15	45	88	65
Nogales, Ariz.....	329	428	2,058	2,815	282	5	74	139	64
Presidio, Tex.....	5	0	1,433	1,438	66	5	15	45	1
Rio Grande City, Tex.....	18	0	107	125	1	1	0	0	0
Roma, Tex.....	8	0	3	11	0	0	0	0	0
San Ysidro, Calif.....	501	1,071	6,110	7,682	124	2	17	105	0
Thayer (Mercedes), Tex.....	0	0	154	154	33	0	2	11	20
Tucson, Ariz.....	298	0	0	298	87	18	44	20	5
Zapata, Tex.....	0	291	79	370	0	0	0	0	0
Total.....	4,793	5,470	162,387	172,650	2,509	144	484	1,592	289
CANADIAN BORDER									
Bellingham, Wash.....	0	0	0	0	0	0	0	0	0
Blaine, Wash.....	667	0	946	1,613	373	26	2	63	282
Buffalo, N. Y.....	599	565	546,485	547,649	275	10	4	126	135
Calais, Maine.....	477	0	9	486	10	3	4	3	0
Chicago, Ill.....	0	0	28	28	12	0	4	7	1

¹ Includes Fort Hancock, Guadalupe Gate, and Ysleta.

MEDICAL INSPECTION OF ALIENS—continued

TABLE 7.—*Aliens inspected and certified at international border stations during the fiscal year 1938—Continued*

Place	Number of persons making permanent entry examined	Number of persons making temporary entry examined	Other persons examined	Total number of persons examined	Aliens certified				
					Total	Class A		Class B	Class C
						I	II		
CANADIAN BORDER—contd.									
Detroit, Mich.	2,694	1,081	600	4,375	381	93	39	249	0
Duluth, Minn.	0	747	3,669	4,416	0	0	0	0	0
Eastport, Idaho.	176	235	0	411	31	0	0	31	0
Eastport, Maine.	12	0	74,440	74,452	4	1	0	1	2
Erie, Pa.	0	0	0	0	0	0	0	0	0
Halifax, N. S., Canada.	371	376	56	803	309	1	3	92	213
Havre, Mont.	0	0	3	3	0	0	0	0	0
Houlton, Maine.	167	4	22	193	0	0	0	0	0
International Falls, Minn.	72	3,951	477,196	481,219	64	4	1	56	3
Jackman, Maine.	41	0	25	66	25	1	0	8	16
Malone, N. Y.	1	7	24	32	7	2	0	1	4
Montreal, Canada.	2,552	0	0	2,552	348	55	0	257	36
Newport, Vt.	252	0	382	634	189	12	1	20	156
Niagara Falls, N. Y.	508	781	825,269	826,558	202	12	6	162	22
Noyes, Minn.	12	0	8	20	8	0	6	2	0
Ogdensburg, N. Y.	10	8	0	18	11	2	1	6	2
Oroville, Wash.	0	211	49,411	49,622	1	0	0	0	1
Pembina, N. Dak.	1	1	0	2	2	0	0	2	0
Portal, N. Dak.	21	0	13	34	11	4	0	3	4
Port Angeles, Wash.	0	0	0	0	0	0	0	0	0
Port Huron, Mich.	327	151	758	1,236	148	20	1	102	25
Quebec, Canada.	607	2,566	821	3,994	418	2	0	311	105
Rouses Point, N. Y.	36	0	114	150	32	9	4	19	0
St. Albans, Vt.	121	1	36	158	23	2	1	15	5
St. John, N. B., Canada.	541	215	5	761	57	0	6	35	16
Sault Ste. Marie, Mich.	2	2	0	4	0	0	0	0	0
Scobey, Mont.	7	0	0	7	0	0	0	0	0
Sumas, Wash.	19	22	25	66	16	1	3	11	1
Sweetgrass, Mont.	533	0	7,780	8,313	12	0	1	5	6
Van Buren, Maine.	27	9	6	42	6	1	0	4	1
Vanceboro, Maine.	287	0	1,456	1,743	0	0	0	0	0
Vancouver, B. C., Canada.	0	830	0	830	155	11	7	137	0
Victoria, B. C., Canada.	299	148	0	447	69	5	0	38	26
Winnipeg, Man., Canada.	1,672	426	4,399	6,497	1,458	7	11	1,226	214
Yarmouth, N. S., Canada.	96	0	57	153	37	1	1	35	0
Total.	13,227	12,377	1,993,983	2,019,587	4,694	285	106	3,027	1,276
Total, all stations.	18,020	17,847	2,156,370	2,192,237	7,203	429	590	4,619	1,565

TABLE 8.—*Alien seamen inspected and certified at international border stations during fiscal year 1938*

Place	Number of alien seamen examined	Alien seamen certified				
		Class A		Class B	Class C	Total
		I	II			
Bellingham, Wash.....	49	0	0	0	0	0
Buffalo, N. Y. ¹	9,504	2	0	13	32	47
Chicago, Ill.....	1,909	0	2	22	11	35
Duluth, Minn.....	101	0	0	1	0	1
Eastport, Maine.....	272	0	0	0	0	0
Erie, Pa.....	591	0	0	0	0	0
Ogdensburg, N. Y.....	49	0	0	0	0	0
Port Angeles, Wash.....	69	0	0	0	0	0
Port Huron, Mich.....	145	2	0	11	0	13
St. John, N. B.....	33	0	0	0	2	2
Sault Ste. Marie, Mich.....	162	0	0	0	0	0
Total.....	12,884	4	2	47	45	98

¹ Includes Niagara Falls, N. Y.

MEDICAL INSPECTION OF ALIENS—continued

TABLE 9.—*Distribution, according to class, of applicants for immigration visas who were medically examined during the fiscal year 1938*

Country and consular office	Total number of applicants examined	Number of applicants in each class		
		Quota	Nonquota	Nonimmigrants
WESTERN HEMISPHERE				
Cuba: Habana.....	2, 215	1, 687	524	4
Canada, total.....	17, 256	4, 833	11, 815	608
Montreal.....	5, 761	1, 835	3, 843	83
Quebec.....	455	0	455	0
Toronto.....	3, 286	1, 327	1, 958	1
Vancouver.....	1, 705	477	1, 228	0
Windsor.....	4, 012	972	3, 040	0
Winnipeg.....	1, 774	205	1, 045	524
Yarmouth.....	263	17	246	0
All countries, Western Hemisphere.....	19, 471	6, 520	12, 339	612
EASTERN HEMISPHERE				
Europe, total.....	45, 529	35, 938	9, 580	11
Belgium: Antwerp.....	1, 165	1, 109	56	0
Czechoslovakia: Prague.....	3, 521	2, 945	576	0
Denmark: Copenhagen.....	408	371	37	0
England: London.....	3, 134	2, 503	631	0
Germany: Total.....	20, 186	19, 613	570	3
Berlin.....	3, 531	3, 395	136	0
Hamburg.....	2, 118	2, 026	92	0
Stuttgart.....	12, 384	12, 150	231	3
Vienna.....	2, 153	2, 042	111	0
Holland: Rotterdam.....	962	930	31	1
Ireland, Northern: Belfast.....	223	154	69	0
Irish Free State: Dublin.....	1, 099	902	191	6
Italy: Naples.....	10, 242	3, 846	6, 395	1
Norway: Oslo.....	761	615	146	0
Poland: Warsaw.....	2, 903	2, 229	674	0
Scotland: Glasgow.....	370	274	96	0
Sweden, total.....	555	447	108	0
Goteborg.....	237	190	47	0
Stockholm.....	318	257	61	0
Philippine Islands: Manila.....	261	134	127	0
All countries, Eastern Hemisphere.....	45, 790	36, 072	9, 707	11

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN in charge

The Division of Sanitary Reports and Statistics continued its function of acting as a clearing house for public health information throughout the fiscal year 1938. Data relative to outbreaks and prevalence of diseases, both in the United States and in foreign countries, public health education, results of scientific investigations, and articles relating to health and sanitation were collected and published for the use of all those employed in an ever-expanding field of public health.

MORBIDITY AND MORTALITY REPORTS

UNITED STATES

An index to the weekly trend of communicable diseases throughout the United States is furnished the State and local health authorities and others concerned through the medium of the weekly Public Health Reports. The collection of the material and the publication of these reports is made possible through the cooperation of the State and local health officials, who hold appointments from the Public Health Service at a nominal salary.

The receipt of telegrams weekly from the State health officers showed the current prevalence of diseases, which were compiled, mimeographed, and released at once to the State health officers. Weekly mail reports of communicable diseases in cities were received from health officers of cities of over 10,000 population. Monthly summaries of diseases were received from each State showing many communicable diseases which could not practicably be included in the weekly telegrams. These data, including worldwide prevalence of quarantinable diseases, were published in the Public Health Reports.

Number of cases of certain communicable diseases and cases per 100,000 population in large groups of States in the United States during 1935, 1936, and 1937

Disease	Number of States ¹	Aggregate population (in thousands)			Cases			Cases per 100,000 population		
		1935	1936	1937	1935	1936	1937	1935	1936	1937
Chickenpox.....	46	118, 598	119, 429	120, 165	268, 326	222, 186	272, 901	226.2	186.0	227.1
Diphtheria.....	48	127, 521	128, 429	129, 257	39, 226	30, 018	28, 536	31.0	23.4	22.1
Influenza.....	48	127, 521	128, 429	129, 257	-----	-----	-----	-----	-----	-----
Malaria.....	48	127, 521	128, 429	129, 257	-----	-----	-----	-----	-----	-----
Measles.....	47	125, 522	126, 406	127, 209	742, 459	299, 493	321, 136	591.5	236.9	252.4
Meningococcus meningitis.....	42	121, 692	122, 552	123, 318	5, 687	7, 055	5, 207	4.7	5.8	4.2
Mumps.....	41	95, 231	95, 900	96, 512	148, 362	191, 416	141, 208	155.8	199.6	146.3
Pellagra.....	48	127, 521	128, 429	129, 257	-----	-----	-----	-----	-----	-----
Pneumonia (all forms).....	48	127, 521	128, 429	129, 257	-----	-----	-----	-----	-----	-----
Polio-myelitis.....	48	127, 521	128, 429	129, 257	10, 839	4, 523	9, 511	8.5	3.5	7.4
Scarlet fever.....	48	127, 521	128, 429	129, 257	260, 962	244, 332	228, 887	204.6	190.2	177.1
Smallpox.....	48	127, 521	128, 429	129, 257	7, 957	7, 834	11, 673	6.2	6.1	9.0
Tuberculosis (all forms).....	48	127, 521	128, 429	129, 257	-----	-----	-----	-----	-----	-----
Tuberculosis (respiratory system).....	42	117, 562	118, 372	119, 106	-----	-----	-----	-----	-----	-----
Typhoid and paratyphoid fever.....	48	127, 521	128, 429	129, 257	18, 355	15, 898	16, 033	14.4	12.4	12.4
Whooping cough.....	48	127, 521	128, 429	129, 257	180, 518	147, 237	214, 652	141.6	114.6	166.1

¹ In addition to the number of States given, the District of Columbia is also included.

The reports of the notifiable diseases in States for 1936 were compiled and published. The accompanying tables give a comparison of the numbers of reported cases of the principal notifiable diseases with recorded deaths in the United States for the calendar years 1935, 1936, and 1937.

Number of deaths and deaths per 100,000 population from certain communicable diseases, with number of cases reported for each death registered, in large groups of States² in the United States during 1935, 1936, and 1937

Disease	Deaths			Deaths per 100,000 population			Cases reported for each death registered		
	1935	1936	1937	1935	1936	1937	1935	1936	1937
Chickenpox.....	154	127	116	0.1	0.1	0.1	1,742	1,749	2,353
Diphtheria.....	3,823	3,030	2,615	3.0	2.4	2.0	10	10	11
Influenza.....	28,297	34,261	39,198	22.2	26.7	30.3	-----	-----	-----
Malaria.....	4,322	3,906	2,700	3.4	3.0	2.1	-----	-----	-----
Measles.....	3,681	1,196	1,395	2.9	.9	1.1	202	250	230
Meningococcus meningitis.....	2,424	2,825	2,043	2.0	2.3	1.7	2	2	3
Mumps.....	78	94	57	.1	.1	.1	1,902	2,036	2,477
Pellagra.....	3,463	3,634	3,162	2.7	2.8	2.4	-----	-----	-----
Pneumonia (all forms).....	104,812	118,998	110,068	82.2	92.7	85.2	-----	-----	-----
Poliomyelitis.....	988	740	1,433	.8	.6	1.1	11	6	7
Scarlet fever.....	2,626	2,441	1,765	2.1	1.9	1.4	99	100	130
Smallpox.....	24	33	30	(3)	(3)	(3)	332	237	389
Tuberculosis (all forms).....	69,180	70,922	68,865	54.2	55.2	53.3	-----	-----	-----
Tuberculosis (respiratory system).....	56,567	58,088	56,718	48.1	49.1	47.6	-----	-----	-----
Typhoid and paratyphoid fever.....	3,438	3,112	2,695	2.7	2.4	2.1	5	5	6
Whooping cough.....	4,538	2,584	4,929	3.6	2.0	3.8	40	57	44

² The same States as those for which cases are reported in the preceding table.

³ Less than 0.1 per 100,000 population.

The general death rate of the United States declined slightly, according to a provisional death rate issued by the Bureau of the Census of 11.2 per 1,000 estimated population for 1937, as compared with 11.5 for 1936.

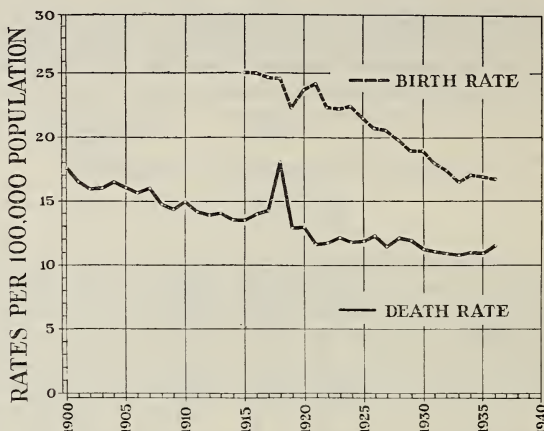
The outstanding items of interest in the field of public health statistics for 1937, discussed more fully in the foreword, are as follows:

The continued decline in infant and maternal mortality; a resumption of the decline of tuberculosis mortality, after a cessation for 1936; epidemics of poliomyelitis and influenza, a 40-percent increase in smallpox prevalence; new low death rates for typhoid fever, scarlet fever, diphtheria, tuberculosis, malaria, pellagra, and nephritis; and continued increase in the number of recognized cases of Rocky Mountain spotted fever, especially in the eastern half of the United States.

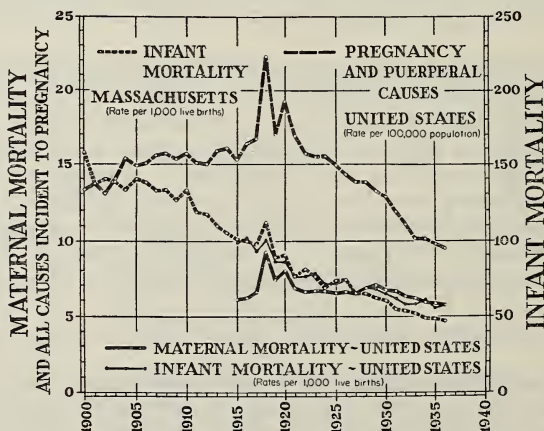
STATEMENT OF PROFIT AND LOSS IN LIFE, 1900-1936

A comparison of the present gross and specific death rates with those of a few years ago indicates that public health workers have reason to congratulate themselves on what has been achieved. More than three-quarters of a million lives were saved in the United States in 1936 as compared with the number of deaths that would have occurred had the death rate remained the same as in 1900. As the result of living under modern conditions and the application of modern public health practices, the mortality rate was 11.5 per 1,000 population in 1936 as compared with 17.6 in 1900.

There are many different causes which contribute to the total death rate, and the improvement shown in that rate as represented by the great reduction in it since 1900 has been unevenly divided among them. For some diseases the mortality rates have actually increased during this period. Without detailed analysis it is apparent that the



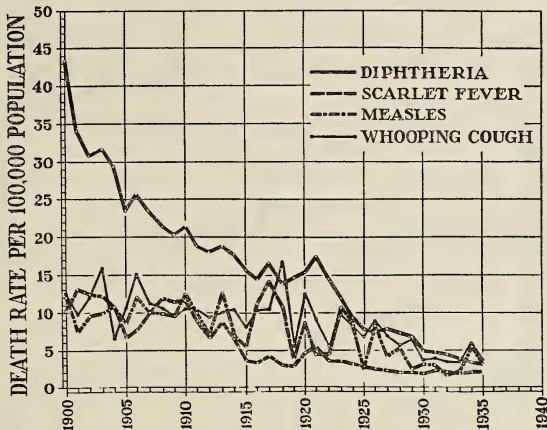
greatest reduction in death rates is shown for those causes which have been the object of the greatest amount of public health effort—typhoid fever, diarrhea and enteritis, smallpox, diphtheria, tuberculosis, and infant mortality; while the increases are found in the so-called degenerative diseases, which attack persons in the higher age groups. The percentage of persons in these age groups in the total population has



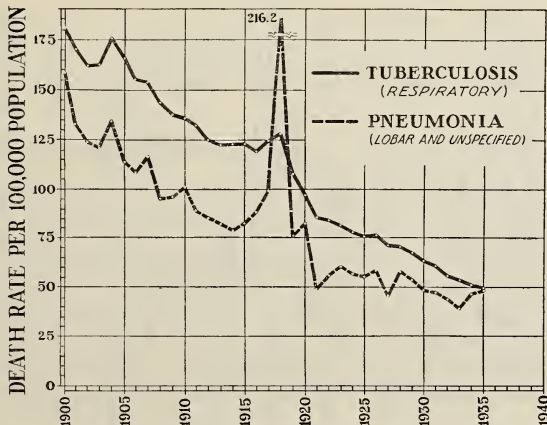
increased, as the greatest results of the application of preventive measures are found in the saving of lives of infants and persons in the early age groups. The chronic diseases of the older ages have only recently been made the subject of intensive study and control measures by official public health services. It is of interest to present a brief accounting in human life covering this period of the present century

and to compare some of the death rates of today with those of a little more than a quarter of a century ago.

The infant mortality rate for Massachusetts (the United States birth registration area was not created until 1915) was between 130 and 150 per 1,000 live births in 1900, whereas today it is less than 50. If the



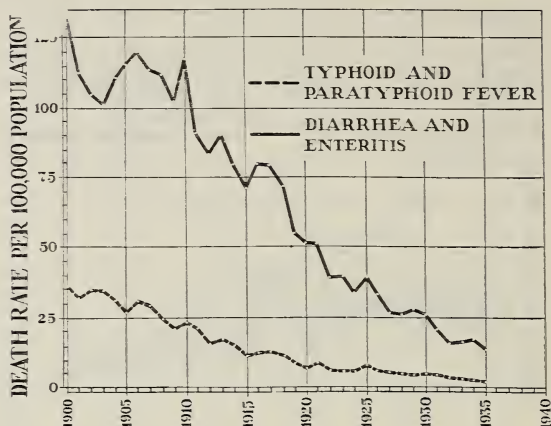
rate at the beginning of the present century had obtained in 1936, there would have been three times as many deaths of infants under 1 year of age as actually occurred, or more than 367,605 such deaths instead of 122,535. The death rate for causes incident to pregnancy has dropped from more than 13 per 100,000 population to around 10, while maternal mortality, based on the number of deaths of mothers per 1,000 live



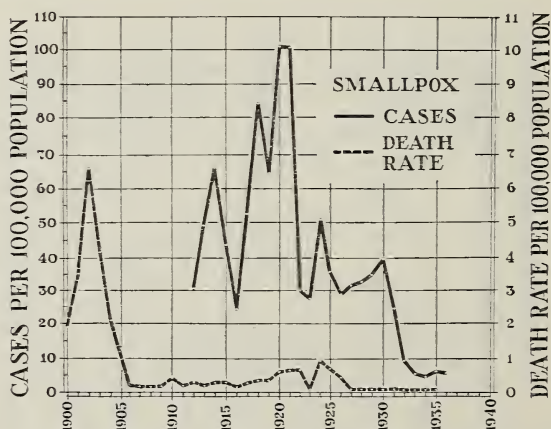
births, a better index to conditions regarding this cause, suggests opportunity for improvement, as the rate has actually shown little change in the United States since 1915.

The death rate for diphtheria has been reduced from 43.3 per 100,000 in 1900 to 2.4 in 1936, which amounted to a saving of 50,000 lives in the latter year. The saving of life as a result of reduction

in the death rate for tuberculosis of the respiratory system shows an even greater profit entry in human accounting. The death rate for this disease was 180.5 per 100,000 population in 1900 as compared with 49.8 in 1935. The difference of more than 130 deaths per 100,000 indicates a saving of 167,800 lives in the latter year. Almost as



great is the saving of life in pneumonia. The drop in the pneumonia (lobar and unspecified) mortality rate from 158.6 per 100,000 in 1900 to 48.4 in 1935 represents a saving of more than 141,000 lives in 1935. Similarly we find great reductions in the death rates for diarrhea and enteritis, and typhoid fever. The reduction in mortality from diarrhea and enteritis represents largely a saving of life in

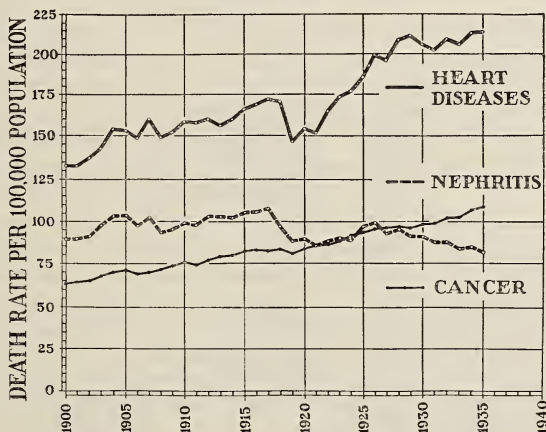


infancy and early childhood and means that a future life of social and economic activity was saved to nearly 153,000 infants and young children, who, under conditions existing in 1900, would have been sacrificed to an insanitary environment in 1936.

On the other side of the ledger, the story is different for a few diseases. In addition to external causes, including suicides and homi-

cides, and especially automobile accidents, there are two important causes of death which have recorded increased rates since 1900, namely, heart disease and cancer. Although a part of the increase for cancer and organic heart disease may be attributed to improved diagnostic technique, there are other fundamental factors involved, such as the changing age composition of the population—the proportionate increase in the number of persons in the older age groups. Errors in diagnosis, on the other hand, merely transfer deaths from one cause to another; they do not affect the final results showing the total lives saved.

The importance of certain diseases as vital public health problems is not depicted in graphs presenting death rates. The full effects of malaria and the venereal diseases, for example, on the health of the people are not revealed in their specific death rates, nor is it at once apparent from these rates that these diseases constitute a very great factor in the gross death rate. Malaria causes disability and lowered economic efficiency for long periods of time, and syphilis



causes untold ill health, suffering, human waste, and financial burdens, while its disastrous effect lies hidden as a contributory cause of death in the mortality rates of the country. Effective methods of prevention and treatment of malaria have been applied for many years, and the death rate from this disease has been cut in half since the beginning of the present century; but the fight against the venereal diseases has been long delayed by social prudery, and only recently have these diseases been made the object of open discussion and control measures as has been the case with other dangerous communicable diseases which public health measures have reduced so phenomenally in recent years.

FOREIGN COUNTRIES

During the calendar year 1937, reports were received from officers of the Public Health Service, American consular officers, International Office of Public Health in Paris, the Pan American Sanitary Bureau, the health section of the League of Nations, and from other

sources relative to the health conditions of the various nations, with particular reference to quarantinable diseases. The accompanying table gives the countries of the world in which the quarantinable diseases are most prevalent and the number of cases and deaths reported for the calendar year 1937. The figures must be considered as incomplete and in most instances as a bare minimum.

Number of cases and deaths from cholera, plague, smallpox, typhus fever, and yellow fever reported in certain countries in 1937

Country	Cases	Deaths	Country	Cases	Deaths
Cholera			Plague		
India.....	169,908	83,914	India.....	33,460	17,036
French Indochina.....	12,238	8,882	Java and Madura.....	(1)	3,764
Siam.....	9,133	6,018	Madagascar.....	915	873
China.....	6,065	1,690	Uganda.....	514	471
Philippine Islands.....	1	1	Ecuador.....	160	87
Other countries.....	1,044	696	Kenya.....	157	(1)
			Peru.....	140	70
Smallpox			Typhus fever		
India.....	104,976	26,447	Rumania.....	4,935	1 99
United States.....	11,673	30	Tunisia.....	3,778	(1)
Nigeria.....	3,585	527	Poland.....	3,501	195
Belgian Congo.....	3,177	60	Algeria.....	3,250	(1)
Indochina.....	3,048	681	Chili.....	2,751	619
Mexico (1936).....	2 2,672	4,627	United States.....	2,299	(1)
Portugal.....	621	43			
Colombia.....	557	13			
Sudan.....	427	58			
Bolivia (6 months).....	176	(1)			
Yellow fever			Yellow fever		
Brazil.....	137	137	Gold Coast.....	77	69
Senegal.....	34	25	Nigeria.....	26	13

¹ Figures not available.

² Incomplete.

OFFICE OF HEALTH EDUCATION

Work of the Office of Health Education, heretofore concerned almost exclusively with the publication of The Health Officer and a class for commissioned officers of the Public Health Service, has been shifted to embrace the broader field of popular health education. The syphilis control campaign, which had begun in the preceding year, served as a demonstration in the development of methods and materials. Mr. Philip S. Broughton, who had been in charge of that work in the Venereal Disease Division, was put in charge.

Work of the office includes writing and revision of the nontechnical publications of the Service; planning of improved printing format for Service publications; the development of graphic materials, including photographs, exhibits, and art work, and motion pictures; cooperation with voluntary health organizations and civic organizations on health education programs; planning the circulation of nontechnical publications for maximum effectiveness; and special educational projects, such as those already undertaken in connection with

syphilis control, and others contemplated on other major disease problems.

In conducting its work the Office stands in a service relationship to the operating State and local health departments on the one hand and the various divisions of the Service on the other.

Its aim is to develop materials of high excellence, which may be voluntarily purchased by State and local, official and unofficial, health agencies, thus securing the economy of large editions and enabling local funds to be devoted to field problems of distribution and operation, rather than expensive duplication of production. Its first publication, Folder No. 1, Syphilis, Its Cause, Its Spread, Its Cure, had by the end of the fiscal year attained a distribution of approximately 440,000 copies, of which 400,000 had been sold—a 10 to 1 relationship between free and paid circulation.

The divisions of the Service, which face special problems on pneumonia, cancer, syphilis, for example, requiring skilled consultation on problems of public relations, rely upon the Office of Health Education, and, in the case of extended programs, may assist in the financing of the work required.

The Health Officer is a monthly bulletin reproduced by the multilith process, the circulation of which is limited to 3,000 copies. It is distributed free of charge to personnel of State, municipal, district, and county departments of health, personnel of the Public Health Service, educational institutions and libraries, and to nonofficial health and welfare agencies. The number of names on the active mailing list as of June 30, 1938, was 2,740.

Since the transfer of Senior Surgeon R. R. Spencer to the National Cancer Institute in November 1937, the staff has been composed of one editor-writer, one stenographer, and one varitypist. During the past fiscal year, the staff has prepared 33 special articles, 9 editorials, 27 book reviews, and 111 condensations, abstracts, or annotations of current literature for publication in The Health Officer. Some 200 additional abstracts have been prepared for the information files.

Original articles have been contributed by Dr. R. R. Spencer, Dr. Ludvig Hektoen, Mr. Joseph A. LePrince, Mr. George St. J. Perrott, Dr. K. E. Miller, and Dr. Claude D. Head, all of the Public Health Service.

In addition to the preparation and production of The Health Officer, the staff has handled the public relations of all major conferences held or sponsored by the Public Health Service in Washington since the initiation of the Office of Health Education in 1936. It has prepared news summaries of the preliminary reports of the National Health Survey and other Public Health Service activities, and during the past fiscal year has assisted in the preparation of articles for lay audiences at the request of various officials of the Service. It has given editorial and varityping service to the President's Interdepartmental Committee to Coordinate Health and Welfare Activities of the Federal Government. It has cooperated with the Division of Adult Education of the Works Progress Administration in the preparation of a sample teaching kit for adult health education, and with the National Cancer Institute in the development of a series of posters for cancer education.

The information files of The Health Officer contain approximately 3,000 references to current literature collected since July 1, 1936. About one-half of these are annotated or abstracted.

NEGRO HEALTH WORK

The current emphasis upon increased and improved health and medical services was reflected in the number of persons and organizations seeking health information and rendering service in promotion of health among the colored population. State and local health departments, voluntary health agencies, and various civic organizations were engaged in both educational and practical activities, including all types of health objectives and enlisting racial and interracial cooperation. There was the usual general participation in the National Negro Health Week observance in the spring of the year, but the year-round follow-up of Health Week plans and new community projects for permanent results furnished evidence of the health consciousness and educational experience stimulated by the brief Health Week program.

The immediate effect of the National Negro Health Week campaign upon the people is indicated by a summary of the records of performance. Approximately 2,000,000 persons in 30 States and over 3,600 communities where there is a large proportion of Negro residents contributed to the wide-spread support of the clean-up, educational, and practical phases of the Health Week program.

Family groups, in 95,421 homes, cleaned, repaired, and beautified their dwellings. Attendance at health lectures totaled 1,250,370 persons; health sermons were delivered to 343,640 people in churches; demonstrations, exhibits, pageants, and motion pictures were viewed by 268,690 visitors; 98,702 men, women, and children received physical examinations, health instruction, and medical services in 1,026 clinics or doctors' offices. Health literature, to the extent of 225,175 publications on adult and child health and community sanitation, was distributed. It is estimated that more than 250,000 persons listened to the 391 radio talks. These figures very probably would show multiple quantities if adequate reporting were made by all groups which request pre-Health Week information and Health Week materials.

Field service for the Negro Health Work section included 15 States and 30 localities. During 152 days of field service 80,670 people were reached through programs of 240 cooperating agencies and group conferences. Health publications, not including 100,000 units of special Health Week literature, were supplied 26,750 persons.

The National Negro Health News, a quarterly bulletin of health information for racial and interracial groups and other persons interested in Negro health welfare, shows an increasing demand. Requests for individual copies, quantities for groups, and for listing on the regular mailing list are received from all parts of the nation and from various individuals and organizations, both official and voluntary.

Statistical data for reported year-round activities in the intervening Health Week periods are not available, but correspondence and field conferences during the year indicate that many communities continue their Health Week organizations and seek the health departments and other health and welfare agencies for aid in development of needed

and beneficial community health projects. The health publications, advice, and field service provided by the Public Health Service in these cooperative relations contribute in large measure to the health consciousness of the Negro and his integration in the health programs of his particular State and community.

PUBLICATIONS ISSUED BY THE DIVISION

The fifty-second annual volume of the weekly Public Health Reports was completed with the issue of December 31, 1937. The Public Health Reports is one of the oldest regular Government periodical publications. It was first printed in 1878 under the title "Bulletins of the Public Health," and contained reports of current prevalence of communicable diseases in the United States and foreign countries, in accordance with the requirements of the National Quarantine Act of April 29, 1878. It was later known as "Abstract of Sanitary Reports," and has been issued under the present title since 1895. During the early years of its publication it dealt, in general, with reports of the prevalence of disease. In 1899 other sanitary information was included, and in 1912, in accordance with the law, articles on the cause and prevention of disease began to appear. Since that time reports of many valuable contributions to preventive medicine and public health made by Public Health Service investigators have first appeared in the Public Health Reports. At the present time it contains summarized reports on the current prevalence of communicable diseases, for the information of State and local health authorities, as required by law, reports of current investigations on the cause, prevention, and control of disease, and other data on health and sanitation for the information of health officers, members of boards or departments of health, and the public as authorized by acts of Congress.

During the fiscal year under report, part 2 of volume 52 and part 1 of volume 53 were issued, comprising 53 numbers, and containing 2,156 pages of text and tabular matter, exclusive of title pages and tables of contents, as compared with 1,715 pages in the fiscal year 1937, 1,828 pages in 1936, and 1,751 pages in 1935. In earlier years these volumes averaged approximately 3,000 pages. The reduction in recent years was made necessary by reduced printing funds, and has greatly restricted the prompt publication of reports on current research and of statistical analyses of morbidity reports. The increase during the present fiscal year is due to an expansion of scientific investigations undertaken under Title VI of the Social Security Act and to funds made available for printing under that act. The Public Health Reports is especially important as a journal for the prompt reporting of scientific research and for recording the current prevalence of the important communicable diseases for the information of the health officers and others concerned with the protection of the public health.

Up to the end of the present fiscal year, 1,952 reprints of articles published in the Public Health Reports have been issued, the first of which appeared in 1899. The printing of separates of the most important articles appearing each week provides for more extensive and more economical distribution to persons especially interested in the particular subjects, and also permits the printing of additional

copies for sale by the Superintendent of Documents, Government Printing Office. During the present fiscal year 117 such reprints were issued, as compared with 76 in 1937, and 65 in 1936.

Special studies in the field of preventive medicine and public health, not suitable for publication in Public Health Reports, have been issued as Supplements to the Public Health Reports since 1918. Fifteen supplements were issued during the year, as follows:

- No. 131. The rat and ratproof construction of buildings, with specifications, drawings, and photographs and a model ratproofing ordinance.
- No. 132. Clinical studies of drug addiction. IV. Suggestibility in narcotic addicts.
- No. 133. Public health nursing.
- No. 134. The notifiable diseases. Prevalence in States, 1936.
- No. 135. Common colds.
- No. 136. Climate and tuberculosis.
- No. 137. Personal hygiene.
- No. 138. Studies on drug addiction. With special reference to chemical structure of opium derivatives and allied synthetic substances and their physiological action.
- No. 139. Report of the Joint Committee on Bathing Places, Conference of State Sanitary Engineers and American Public Health Association, 1937.
- No. 140. Syphilis control in industry.
- No. 141. A brief history of bacteriological investigations of the Public Health Service.
- No. 142. Pneumonia. Mortality and measures for prevention. Report of Advisory Committee on Prevention of Pneumonia Mortality.
- No. 143. A statistical analysis of the clinical records of hospitalized drug addicts.
- No. 144. Suggestibility in chronic alcoholics.
- No. 145. The abuse of codeine. A review of codeine addiction and a study of the minimum cough relieving dose.

Two of these supplements, Nos. 135 and 137, prepared in the Division, deal in a popular manner with health questions of particular interest to the general public, and there has been a great demand for copies of these publications.

During the year one miscellaneous publication was issued through the Division—No. 31, Regulations for the Control of the Manufacture, Importation, and Sale of Arsphenamine and Its Derivatives, Referred to Collectively as “the Arsphenamines and another, No. 30, The Communicable Diseases, was prepared for the printer.”

New editions of eight previously issued publications were secured during the year, several of which were completely revised and brought up to date. In issuing new editions, it is the present purpose to keep revised, in accordance with the latest information, all publications distributed by the Public Health Service.

The Hospital News, a semimonthly collection of clinical reports from hospital personnel, reproduced by the multilith process, was edited in this Division and issued regularly during the year. The purpose of the Hospital News, which is now in its fifth volume, is to bring information regarding case histories, clinical research, practices, observations, and improvements in the marine hospitals to the attention of all hospital personnel. It is not a publication in the scientific sense of the word, as its distribution is limited to Public Health Service personnel and it is not for sale. Much of the material used, however, merits wider distribution.

The Health Officer was issued monthly during the year by the Office of Public Health Education, as reported elsewhere.

The National Negro Health Week publications—bulletin, leaflet, and poster—were issued by this Division during the year. The Public Health Service cooperates in this way in the observance of this Health Week, the purpose of which is to improve the health and living conditions of Negroes by presenting an intensified health program for one week during the year, but with a year-round program.

PUBLICATIONS DISTRIBUTED AND EXHIBITS PREPARED

There were 142 new publications distributed by the Division, as compared with 99 during the preceding year. A total distribution of 213,036 copies of new publications and of editions of previously published documents was made. Of these, 162,714 were sent in response to individual requests for information and 50,322 were distributed to Service mailing lists.

Thirty-five requests for the loan of stereopticon slides were received. There were 1,674 slides lent in response to these requests to universities, public health lecturers, officials of the Public Health Service, and others.

As in previous years, a small appropriation for the preparation and display of exhibits relating to public health was made. This appropriation is especially helpful in providing exhibits on certain diseases upon which scientific health information relating to such diseases is needed. A permanent exhibit room is maintained in the administration building of the Service in Washington, to which new material was added during the year.

The following is a list of publications distributed by the Division during the fiscal year:

REPRINTS FROM THE PUBLIC HEALTH REPORTS

1811. Public Health Service publications. A list of publications issued during the period July–December 1936. March 26, 1937. 4 pages.
1812. Studies of sewage purification. VI. Biochemical oxidation by sludges developed by pure cultures of bacteria isolated from activated sludge. By C. T. Butterfield, C. C. Ruchhoft, and P. D. McNamee. April 2, 1937. 26 pages.
1813. The treatment of blacktongue with a preparation containing the “filtrate factor,” and evidence of riboflavin deficiency in dogs. By W. H. Sebrell, R. H. Onstott, and D. J. Hunt. April 9, 1937. 7 pages.
1814. Labile bacterial antigens and methods of preparing and preserving them. By Stuart Mudd, E. J. Czarnetzky, Horace Pettit, and David Lackman. April 9, 1937. 3 pages.
1815. Age of gainful male workers in different geographic regions of the United States, 1920 and 1930. Studies on the age of gainful workers no. 2. By William M. Gafafer. April 9, 1937. 17 pages.
1816. Studies on trichinosis. I. The incidence of trichinosis as indicated by post-mortem examinations of 300 diaphragms. By Maurice C. Hall and Benjamin J. Collins. April 16, 1937. 22 pages.
1817. Studies on trichinosis. II. Some correlations and implications in connection with the incidence of trichinae found in 300 diaphragms. By Maurice C. Hall and Benjamin J. Collins. April 23, 1937. 16 pages.
1818. Sickness among male industrial employees during the final quarter of 1936 and the year as a whole. By Dean K. Brundage. April 30, 1937. 3 pages.
1819. Studies on trichinosis. III. The complex clinical picture of trichinosis, and the diagnosis of the disease. By Maurice C. Hall. April 30, 1937. 12 pages.
1820. Radio pratique. Pratique by wireless in lieu of quarantine inspection for passenger vessels. By C. V. Akin. April 23, 1937. 5 pages.

1821. Mortality in certain States during 1936, with comparative data for recent years. May 7, 1937. 11 pages.
1822. Tuberculosis control by a small county health department. Brunswick-Greenville health administration studies no. 8. By J. O. Dean. May 7, 1937. 12 pages.
1823. Seasonal patterns and trends of communicable diseases. By Robert Olesen and Brock C. Hampton. May 7, 1937. 8 pages.
1824. Dibenzanthracene tumors in mice. The production of subcutaneous pulmonary and liver tumors by serum dispersions and lard solutions. By H. B. Andervont and Egon Lorenz. May 14, 1937. 11 pages; 2 plates.
1825. Studies in chemotherapy. IV. Comparative studies of sulphonamide compounds in experimental pneumococcus, streptococcus, and meningococcus infections. By Sanford M. Rosenthal, Hugo Bauer, and Sara E. Branham. May 21, 1937. 10 pages.
1826. Studies in chemotherapy. V. Sulphanilamide, serum, and combined drug and serum therapy in experimental meningococcus and pneumococcus infections in mice. By Sara E. Branham and Sanford M. Rosenthal. May 28, 1937. 11 pages.
1827. Some experiments with rats and rat guards. By O. E. Denney. June 4, 1937. 4 pages; 8 plates.
1828. A new species of *Thrassis* (Siphonaptera). By William L. Jellison. June 4, 1937. 4 pages.
1829. Age of gainful female workers in different geographic regions of the United States, 1920 and 1930. Studies on the age of gainful workers no. 3. By William M. Gafafer. June 4, 1937. 19 pages.
1830. Report of two outbreaks of food poisoning. By J. C. Geiger. June 11, 1937. 8 pages.
1831. Incidence of spontaneous tumors in a colony of strain C₃H mice. By H. B. Andervont and W. J. McEleney. June 11, 1937. 9 pages.
1832. Geographical distributions of mortality from tuberculosis, cancer, appendicitis, and typhoid fever in the white population of the United States. By L. L. Lumsden and C. C. Dauer. June 18, 1937. 8 pages.
1833. The need for industrial hygiene courses in public health curricula. By J. J. Bloomfield and R. R. Sayers. June 18, 1937. 4 pages.
1834. Purification and precipitation of the erythrogenic factor of scarlet fever streptococcus toxin and its antigenic value. By M. V. Veldee. June 25, 1937. 11 pages.
1835. Typhoid vaccine: The technique of its preparation at the Army Medical School. By Rufus L. Holt and Arthur P. Hitchens. June 25, 1937. 16 pages; 4 plates.
1836. Studies on trichinosis. IV. The role of the garbage-fed hog in the production of human trichinosis. By Maurice C. Hall. July 2, 1937. 14 pages.
1837. A low temperature ball mill for the liberation of labile cellular products. By Stuart Mudd, C. H. Shaw, E. J. Czarnetzky, and Earl W. Florsdorf. July 2, 1937. 6 pages.
1838. Spontaneous mammary tumors in mice. Factors influencing the incidence of metastases. By L. L. Ashburn. July 9, 1937. 14 pages.
1839. Experimental studies of natural purification in polluted waters. X. Reoxygenation of polluted waters by microscopic algae. By W. C. Purdy. July 16, 1937. 34 pages.
1840. Some factors which affect the relationship between housing and health. By J. M. DallaValle. July 23, 1937. 10 pages.
1841. Age of gainful white and Negro male workers of the United States 1920 and 1930. Studies on the age of gainful workers no. 4. By William M. Gafafer. July 23, 1937. 13 pages.
1842. A study of syphilis in the Coast Guard. By H. McG. Robertson. July 30, 1937. 8 pages.
1843. Recent court decisions on milk control (1934-37). By James A. Tobey. July 30, 1937. 7 pages.
1844. Studies on chronic brucellosis. I. Introduction. By Alice C. Evans. August 6, 1937. 5 pages.
1845. Case records as an index of the public health nurse's work. By Helen Bean and Emily Hankla. August 6, 1937. 12 pages.

1846. Report on market-milk supplies of certain urban communities. Compliance of the market-milk supplies of certain urban communities with the Grade A pasteurized and Grade A raw milk requirements of the Public Health Service Milk Ordinance and Code (as shown by compliance (not safety) ratings of 90 percent or more reported by the State milk-sanitation authorities during the period July 1, 1935, to June 30, 1937). August 6, 1937. 5 pages.
1847. The occurrence in the sera of man and monkeys of protective antibodies against the virus of lymphocytic choriomeningitis as determined by the serum-virus protection test in mice. By Jerald G. Wooley, Charles Armstrong, and Robert H. Onstott. August 13, 1937. 10 pages.
1848. Note on comparative tests made with the Hatch and the Greenburg-Smith impingers. By J. M. DallaValle. August 13, 1937. 4 pages.
1849. Public Health Service publications. A list of publications issued during the period January-June 1937. August 13, 1937. 5 pages.
1850. Experimental meningitis in guinea pigs. By S. E. Branham, R. D. Lillie, and A. M. Pabst. August 20, 1937. 9 pages; 2 plates.
1851. Serum studies in experimental meningitis. Lack of protection for rabbits and guinea pigs. By Sara E. Branham and Anna M. Pabst. August 20, 1937. 8 pages.
1852. The elimination of selenium and its distribution in the tissues. By M. I. Smith, B. B. Westfall, and E. F. Stohman. August 27, 1937. 6 pages.
1853. Notes on the continuous rearing of *Aedes aegypti* in the laboratory. By H. A. Johnson. August 27, 1937. 3 pages.
1854. Studies in chemotherapy. VI. The chemotherapy of choriomeningitis virus infection in mice with sulphonamide compounds. By Sanford M. Rosenthal, Jerald G. Wooley, and Hugo Bauer. September 3, 1937. 7 pages.
1855. Toxicology of selenium. IV. Effects of exposure to hydrogen selenide. By H. C. Dudley and John W. Miller. September 3, 1937. 14 pages.
1856. Biological products. Establishments licensed for the propagation and sale of viruses, serums, toxins, and analogous products. September 3, 1937. 6 pages.
1857. Further studies on the minimal threshold of chronic endemic dental fluorosis. By H. Trendley Dean and Elias Elvove. September 10, 1937. 16 pages.
1858. Relationship of a rural health program to the needs in the area. By Joseph W. Mountin, Elliott H. Pennell, and Hazel O'Hara. September 10, 1937. 21 pages.
1859. Disabling illness among industrial employees in 1936 as compared with earlier years. By Dean K. Brundage. September 17, 1937. 7 pages.
1860. Removal of fluoride from water. By Elias Elvove. September 17, 1937. 7 pages.
1861. Note on a new ocular micrometer for use in dust counting. By Richard T. Page. September 17, 1937. 2 pages.
1862. Cultivation of the rickettsiae of Rocky Mountain spotted fever in vitro. By Ida A. Bengtson. September 24, 1937. 7 pages; 4 plates.
1863. Cultivation of the rickettsiae of endemic (murine) and epidemic (European) typhus fever in vitro. By Ida A. Bengtson. September 24, 1937. 5 pages; 4 plates.
1864. Further field studies on the selenium problem in relation to public health. By M. I. Smith and B. B. Westfall. October 1, 1937. 10 pages.
1865. How expenditures for selected public health services are apportioned. By Joseph W. Mountin. October 1, 1937. 6 pages.
1866. The use of a dark adaptation technique (biophotometer) in the measurement of vitamin A deficiency in children. By Carroll E. Palmer and Harold Blumberg. October 8, 1937. 16 pages.
1867. Studies on chronic brucellosis. II. Description of techniques for specific tests. By Alice C. Evans. October 8, 1937. 9 pages; 1 plate.
1868. Dermatitis among a group of office workers found not to be of occupational origin. By Louis Schwartz and Marion B. Sulzberger. October 15, 1937. 7 pages; 1 plate.
1869. Studies on the infection of dogs with trophozoites of *Endamoeba histolytica* by the oral route. A preliminary report. By John Clyde Swartzwelder. October 15, 1937. 5 pages.
1870. Progress in oyster conditioning. With report of experiments at the demonstration plant, Norfolk, Va. By Richard Messer and George M. Reece. October 15, 1937. 9 pages.

1871. Studies on oxyuriasis. VI. The incidence of oxyuriasis in 1,272 persons in Washington, D. C., with notes on diagnosis. By Eloise B. Cram, Myrna F. Jones, Lucy Reardon, and Mabelle O. Nolan. October 22, 1937. 25 pages.
1872. The association of scurvy with oral diseases. By F. C. Cady. October 29, 1937. 5 pages.
1873. Kentucky's plan for public health education. By A. T. McCormack and Reba F. Harris. October 29, 1937. 5 pages.
1874. General aspects and functions of the sick benefit organization. By R. R. Sayers, Gertrud Kroeger, and W. M. Gafafer. November 5, 1937. 18 pages.
1875. Treatment of psoriasis with massive doses of crystalline vitamin D and irradiated ergosterol. A preliminary report. By E. T. Ceder and Leo Zon. November 5, 1937. 4 pages.
1876. Pulmonary tumors in mice. IV. Lung tumors induced by subcutaneous injection of 1:2:5:6-dibenzanthracene in different media and by its direct contact with lung tissues. By H. B. Andervont. November 5, 1937. 6 pages; 3 plates.
1877. State and insular health authorities, 1937. Directory, with data as to appropriations and publications. November 12, 1937. 20 pages.
1878. Protracted incubation in malarial fever. Report of a case and a review of the literature. By Bruce Mayne. November 12, 1937. 9 pages.
1879. Extent of rural health service in the United States, December 31, 1932, to December 31, 1936. November 19, 1937. 28 pages.
1880. Directory of whole-time county health officers, 1937. November 19, 1937. 14 pages.
1881. Immunizing properties of formolized Rocky Mountain spotted fever rickettsiae cultivated in modified Maitland media. By Ida A. Bengtson. November 26, 1937. 6 pages.
1882. Methods for the determination of quartz in industrial dusts. By F. H. Goldman. November 26, 1937. 11 pages.
1883. A study of dust control methods in an asbestos fabricating plant. By Richard T. Page and J. J. Bloomfield. November 26, 1937. 16 pages; 3 plates.
1884. The increase in average length of life. By Harold F. Dorn. December 3, 1937. 25 pages.
1885. An approach to a rural mental health problem. By J. Allen Jackson. December 3, 1937. 6 pages.
1886. Health supervision by nurses in a bicounty health department. Brunswick-Greenville health administration studies no. 9. By Rosalie I. Peterson. December 3, 1937. 11 pages.
1887. Seasonal variation in intensity of brain reaction of the St. Louis encephalitis in mice and of endemic typhus in guinea pigs. By R. D. Lillie, R. E. Dyer, C. Armstrong, and J. G. Pasternack. December 10, 1937. 18 pages.
1888. City health officers, 1937. Directory of those in cities of 10,000 or more population. December 10, 1937. 18 pages.
1889. Medical activities at the Boy Scout Jamboree held in Washington, D. C., June 30-July 9, 1937. By W. L. Smith. December 17, 1937. 11 pages; 3 plates.
1890. Effect of addition of dithioethylamine (cystine amine) to the diet of the albino rat. By W. H. Sebrell, R. H. Onstott, D. J. Hunt, and R. D. Lillie. December 24, 1937. 7 pages; 7 plates.
1891. The use of pure strain animals in studies on natural resistance to transplantable tumors. By H. B. Andervont. December 24, 1937. 11 pages.
1892. Mortality from rheumatic heart disease in Philadelphia during 1936. By O. F. Hedley. December 31, 1937. 17 pages.
1893. The family as a unit for nursing service. By Helen Bean and Georgie S. Brockett. December 31, 1937. 8 pages.
1894. Dibenzanthracene tumors in mice. The production of subcutaneous and pulmonary tumors by 1:2:5:6-dibenzanthracene absorbed on charcoal. By H. B. Andervont and Egon Lorenz. December 31, 1937. 14 pages.
1895. Studies on chronic brucellosis. III. Methods used in obtaining cultures. By Mary A. Poston. January 7, 1938. 4 pages.

1896. Age of gainful white and Negro female workers of the United States, 1920 and 1930. Studies on the age of gainful workers no. 5. By William M. Gafafer. January 7, 1938. 13 pages.
1897. A study of the variations in reports on hospital facilities and their use. By Joseph W. Mountin, Elliott H. Pennell, and Emily Hankla. January 7, 1938. 9 pages.
1898. Studies in chemotherapy. VII. Some new sulfur compounds active against bacterial infections. By Hugo Bauer and Sanford M. Rosenthal. January 14, 1938. 10 pages.
1899. The blacktongue-preventive value of whole whey, delactosed whey, and American cheese. By W. H. Sebrell, R. H. Onstott, and D. J. Hunt. January 21, 1938. 12 pages.
1900. Riboflavin deficiency in dogs. By W. H. Sebrell and R. H. Onstott. January 21, 1938. 12 pages.
1901. Toxicology of selenium. V. Toxic and vesicant properties of selenium oxychloride. By H. C. Dudley. January 21, 1938. 4 pages.
1902. Pathologic histology in mice produced by intravenous inoculation with the toxin of *Clostridium sordellii* (bifermentans). By R. D. Lillie. January 28, 1938. 9 pages.
1903. The pollution problem in the Ohio River drainage basin. By H. R. Crohurst. January 28, 1938. 7 pages.
1904. Report on market-milk supplies of certain urban communities. Compliance of the market-milk supplies of certain urban communities with the Grade A pasteurized and Grade A raw milk requirements of the Public Health Service Milk Ordinance and Code (as shown by compliance (not safety) ratings of 90 percent or more reported by the State milk-sanitation authorities during the period January 1, 1936, to December 31, 1937). January 28, 1938. 5 pages.
1905. The accuracy of certified causes of death. Recommendations of the Committee on the Accuracy of Certified Causes of Death of the American Public Health Association for the Revision of the International List of Causes of Death in 1938. February 4, 1938. 34 pages.
1906. Harmful industrial dusts. By R. R. Sayers. February 11, 1938. 12 pages.
1907. The production of tumors in mice of strains C₃H and Y by dibenzanthracene and methylcholanthrene. By H. B. Andervont. Pulmonary tumors in mice. V. Further studies on the influence of heredity upon spontaneous and induced lung tumors. By H. B. Andervont. February 11, 1938. 9 pages.
1908. The role of airplane dusting in the control of *Anopheles* breeding associated with impounded waters. By R. B. Watson, C. C. Kiker, and H. A. Johnson. February 18, 1938. 13 pages; 4 plates.
1909. Reliability of medical judgments on malnutrition. By Mayhew Derryberry. February 18, 1938. 6 pages.
1910. Selenium as a potential industrial hazard. By H. C. Dudley. February 25, 1938. 12 pages.
1911. Acute response of guinea pigs to inhalation of methyl isobutyl ketone. By H. Specht. February 25, 1938. 9 pages; 1 plate.
1912. Studies of the bactericidal treatment of milk cans in hot-air cabinets. March 4, 1938. 10 pages; 2 plates.
1914. A modified cell for dust counting. By Charles E. Couchman and Wilmer H. Schulze. March 4, 1938. 4 pages; 1 plate.
1915. Prevalence of trichinosis in the United States. By Willi Sawitz. March 11, 1938. 19 pages.
1916. A study of *Trichinella spiralis* in the Hawaiian Islands. By Joseph E. Alicata. March 11, 1938. 10 pages.
1918. The validity of health service data gathered by the family survey method. By Elliott H. Pennell and Hazel O'Hara. March 25, 1938. 8 pages.
1919. A study of dental care in Detroit, Mich. By Rollo H. Britten. March 25, 1938. 14 pages.
1920. Differences in opportunities for health. By Joseph W. Mountin and Hazel O'Hara. April 1, 1938. 12 pages.
1921. Contamination of pasteurized milk by improper relative pressures in regenerators. By A. W. Fuchs. April 1, 1938. 10 pages.
1922. Disabling sickness among male industrial employees during the final quarter of 1937 and the entire year. By William M. Gafafer and Elizabeth S. Frasier. April 8, 1938. 5 pages.

1923. Variations in the form and services of public health organizations. By Joseph W. Mountin, Anthony J. Borowski, and Hazel O'Hara. April 8, 1938. 14 pages.
1927. Public Health Service publications. A list of publications issued during the period July–December 1937. April 22, 1938. 5 pages.
1928. Serums, antitoxin, and drugs in the treatment of meningococcus meningitis. By Sara E. Branham. April 29, 1938. 7 pages.
1930. Trends in shellfish sanitation. By H. N. Old. May 6, 1938. 9 pages.
1931. Planning the organization and conduct of stream pollution surveys. By J. K. Hoskins. May 6, 1938. 7 pages.
1934. The influence of nonbreeding and foster nursing upon the occurrence of spontaneous breast tumors in strain C₃H mice. By H. B. Andervont and W. J. McEleney. May 13, 1938. 6 pages.
1935. Prophylactic value of a single dose of precipitated pertussis vaccine. Preliminary report. By W. T. Harrison, Jos. P. Franklin, and Joseph A. Bell. May 20, 1938. 4 pages.

SUPPLEMENTS

127. Suggestibility in delinquent and nondelinquent adult white males. By Victor H. Vogel. 1937. 10 pages; 1 plate.
128. Clinical studies of drug addiction. III. A critical review of the withdrawal treatments with method of evaluating abstinence syndromes. By Lawrence Kolb and C. K. Himmelsbach. 1938. 33 pages.
129. The bedbug. Its relation to public health, its habits and life history, and methods of control. By Maurice C. Hall. 1937. 7 pages.
130. Some Public Health Service publications suitable for general distribution. 1937. 22 pages.
131. The rat and ratproof construction of buildings. With specifications, drawings, and photographs and a model ratproofing ordinance. By B. E. Holsendorf. Drawings by P. W. Clark. 1937. 68 pages; 31 plates.
132. Clinical studies of drug addiction. IV. Suggestibility in narcotic addicts. By Victor H. Vogel. 1937. 7 pages; 1 plate.
133. Public health nursing. Prepared by Pearl McIver. 1937. 14 pages.
134. The notifiable diseases. Prevalence in States, 1936. 13 pages.
135. Common colds. By Robert Olesen. 1938. 8 pages.
136. Climate and tuberculosis. By F. C. Smith. 1938. 6 pages.
137. Personal hygiene. Compiled by Robert Olesen. 46 pages.
142. Pneumonia. Mortality and measures for prevention. Report of Advisory Committee on Prevention of Pneumonia Mortality. 1938. 32 pages.

PUBLIC HEALTH BULLETINS

235. Mortality among southern Negroes since 1920. With comparative data for southern whites and northern Negroes. By Mary Gover. June 1937. 52 pages.
237. Illness and medical care in Puerto Rico. By Joseph W. Mountin, Elliott H. Pennell, and Evelyn Flook. June 1937. 63 pages; 16 half tones.
238. Occupational and environmental analysis of the cement, clay, and pottery industries. By R. R. Sayers, J. M. DallaValle, and S. G. Bloomfield. September 1937. 50 pages.
239. Dental caries in American Indian children. By Henry Klein and Carroll E. Palmer. December 1937. 54 pages.
240. Epidemiological study of an epidemic, diagnosed as poliomyelitis, occurring among the personnel of the Los Angeles County General Hospital during the summer of 1934. By A. G. Gilliam. April 1938. 90 pages.
242. Care during the recovery period in paralytic poliomyelitis. By Henry O. Kendall and Florence P. Kendall. With an introduction by George E. Bennett and Robert W. Johnson, Jr. April 1938. 92 pages; 14 half tones.

UNNUMBERED PUBLICATIONS

- Index to Public Health Reports, volume 52, part 1, January–June 1937. 26 pages.
- Index to Public Health Reports, volume 52, part 2, July–December 1937. 25 pages.

Treatment of malaria leaflet. Reprinted from Public Health Reports. May 28, 1937. 1 page.

National Negro Health Week program. This pamphlet is published annually usually about the middle of March, for community leaders in an effort to suggest ways and means by which interested individuals and organizations may be organized for a concerted and effective attack upon the community's disease problems. Twenty-fourth annual observance. 1938. 8 page folder.

National Negro Health Week poster. Twenty-fourth annual observance. 1938.

National Negro Health Week leaflet. Twenty-fourth annual observance. 1938. 2 pages.

ANNUAL REPORT

Annual Report of the Surgeon General of the United States Public Health Service for the fiscal year 1937. 164 pages.

DIVISION OF MARINE HOSPITALS AND RELIEF

Asst. Surg. Gen. S. L. CHRISTIAN in charge

The Hospital Division, through the marine hospitals and other relief stations, has continued its function of furnishing outpatient and hospital treatment to merchant seamen and other legal beneficiaries in 154 ports of the United States and its possessions. Contracts were maintained with 140 hospitals located in ports not served by the 25 marine hospitals. A total of 60,403 inpatients were furnished 2,004,154 days relief and 506,528 outpatients received 1,460,798 treatments. At the close of the year 5,262 patients remained in the hospitals, including 176 insane in St. Elizabeths Hospital, Washington, D. C., 36 insane in State hospitals in California, and 349 patients at the National Leprosarium at Carville, La. Incidentally, the number of patients remaining at the leprosarium was smaller than at the end of any of the past seven years.

While there was an appreciable increase in the number of inpatients admitted, there was a decrease in the number of hospital days relief furnished per patient. The increase in number of patients treated was partly due to the increase in Works Progress Administration and Veterans' Administration patients, while the decrease in hospital days relief per patient was greatly due to better facilities for treatment and the use of the drug sulfanilamide in the treatment of gonococcus and streptococcus infections.

Consent to perform post mortem examination was obtained in a large percentage of cases where death occurred. In the American Medical Association's list of 27 hospitals, out of 732 approved for interne training, attaining an autopsy rate of 70 percent or over, there were included two marine hospitals, namely, those at Baltimore and Norfolk.

By the act of July 30, 1937, the dependent members of families of officers and enlisted men of the Coast Guard, retired list included, were made beneficiaries of the Public Health Service. They were granted the privilege of receiving inpatient treatment at first class stations at the uniform per-diem rate for Government hospitals. This necessitated providing additional facilities for the care of women and children and likewise widened the scope of treatment rendered and operations performed.

After nearly three quarters of a century the method of admitting insane beneficiaries to St. Elizabeths Hospital had to be changed. Habeas corpus proceedings were brought by a seaman confined there and the District Court of Appeals ordered his release because he had not been adjudicated insane. Future admissions of Public Health Service beneficiaries will be effected on a commitment basis.

In January 1938, 217 additional attendants were authorized for auxiliary duty with the nursing service in a nonprofessional capacity

GROUP OF HOSPITALS	HOSPITAL LOCATION	COST PER PATIENT DAY				SALARIES FOOD OTHER								
		RELIEF DAYS	TOTAL	SALARIES	FOOD	OTHER	1	2	3	4	5	6	7	8
GENERAL	Baltimore, Md.	129,350	\$3.28	\$1.89	\$0.42	\$0.97								
	Boston, Mass.	59,842	4.00	2.54	.46	1.00								
	Buffalo, N. Y.	25,152	4.06	2.48	.39	1.19								
	Chicago, Ill.	64,798	4.43	2.65	.42	1.36								
	Cleveland, Ohio	61,465	3.52	2.23	.43	.80								
	Detroit, Mich.	87,267	3.51	2.23	.40	.80								
	Ellis Island, N. Y.	121,117	4.09	2.45	.44	1.20								
	Franklin, Ind.	22,088	4.41	2.78	.39	1.24								
	Galveston, Texas	60,374	3.59	2.17	.43	.99								
	Gen. West, Fla.	16,422	4.39	2.49	.52	1.36								
	Kentville, Ky.	39,715	4.24	2.78	.45	1.02								
	Memphis, Tenn.	39,305	4.00	2.18	.45	1.37								
	Mobile, Ala.	53,610	3.02	1.74	.38	.90								
	New Orleans, La.	156,708	3.95	2.06	.45	.74								
	Norfolk, Va.	66,811	3.67	2.07	.42	1.18								
	Pittsburgh, Pa.	28,911	3.42	2.04	.46	.92								
	Portland, Me.	19,197	4.51	2.61	.46	1.04								
	St. Louis, Mo.	35,193	3.57	2.22	.40	.95								
	San Francisco, Calif.	146,776	3.41	2.17	.40	.84								
	Seattle, Wash.	152,277	3.41	2.17	.43	.73								
	States Island, N. Y.	222,595	3.52	2.03	.44	1.05								
	Viewward Haven, Mass.	6,894	4.15	2.95	.47	.73								
	New York, N. Y. (a)													
	Per diem cost for General Hospitals		3.59	2.16	.43	.96								
	Total Relief Days	1,668,126	Cost \$5,983,746.96											
TUBERCULOSIS SANATORIUM	Fort Stanton, N. M.	63,150	3.85	2.00	.56	1.27								
			Cost \$ 242,641.37											
LEPROSARIUM	Carville, La.	132,331	3.05	1.70	.44	.91								
			Cost \$ 403,047.38											
ALL	Per diem cost for all hospitals		3.56	2.14	.44	.98								
	Relief days for all hospitals	1,863,607	Cost \$6,629,637.71											

(a) In-patient department of station closed.

Average per diem cost of in-patient relief, United States marine hospitals, fiscal year 1938.

in order that nurses might devote more time to professional duties. Although this auxiliary service materially increased the efficiency of the nursing service it was not possible to reduce the number of working hours to 44 per nurse per week. Night nurses still work from 69 to 80 hours weekly.

Research was continued in pyretotherapy, focal infection, arthritis, and psoriasis, and while important advances were made, more time and work are necessary before the true merits of all the studies can be evaluated. Tentative plans have been made for the establishment of a tumor clinic for clinical research at the Marine Hospital in Baltimore, space already having been set aside both for patients and equipment.

The sum of \$758,146 was expended for supplies and equipment for all hospitals, approximately \$300,000 being spent for the latter.

Construction of a new 144 bed marine hospital was begun at St. Louis, Mo., new quarters, wards, and other buildings were added at Carville, Evansville, Memphis, and Vineyard Haven, and many repairs and improvements were effected at various other marine hospitals. The grounds of many of the hospitals were improved through landscaping and other improvements. Plans and specifications for the proposed new Marine Hospital at Boston were completed. Allotments were obtained to carry out the first two steps in the proposed rehabilitation program at the Marine Hospital at Carville, and the first step at Fort Stanton.

The Service continued to cooperate with other government departments in Washington in furnishing emergency medical relief to employees and supervising 19 medical relief units in the Treasury Department and other agencies. Likewise, valuable cooperation was given to and received from various health departments, city officials, civic organizations, and private individuals.

For a complete statement of relief furnished at the marine hospitals and relief stations and the customary collateral functions performed by the hospitals for the Coast Guard, Army, Navy, Employees' Compensation Commission, Civil Service Commission, Bureau of Marine Inspection and Navigation, Lighthouse Service, Immigration Service, Coast and Geodetic Survey, Veterans' Administration, Bureau of Fisheries, Civilian Conservation Corps, Works Progress Administration, Civil Works Administration, and others, see pages 122 to 126.

CLASSES OF BENEFICIARIES AND AMOUNT AND CHARACTER OF SERVICES RENDERED

Summary of services by class of beneficiary

Class of beneficiary	Hospital days		Out-patient treatments		Physical examinations (not related to treatment)		Remarks
	Number	Percent of total	Number	Percent of total	Number	Percent of total	
American merchant seamen.	1,153,053	57.53	639,776	43.80	30,968	18.77	Communicable diseases are reported to local health officers.
Veterans.....	195,767	9.77	1,056	.07	1,927	1.17	Patients of the Veterans' Administration.
Patients afflicted with leprosy.	132,361	6.60	57	-----	2	-----	National Leprosarium, Carville, La.
Coast Guard personnel....	84,784	4.23	121,849	8.34	8,284	5.02	All medical services and supplies, ashore and afloat.
Coast Guard dependents...	2,116	.11	18,470	1.26	60	.04	Pay for hospital care.
Injured Federal employees.	85,024	4.24	117,883	8.07	26,376	15.99	Patients of the Employees' Compensation Commission.
Immigrants.....	42,272	2.11	5,520	.38	1,035	.63	Patients of the Bureau of Immigration.
Seamen, Engineer Corps and Army Transport Service.	46,962	2.34	25,524	1.75	2,368	1.43	Civilian employees on Army vessels.
Seamen from foreign vessels.	13,725	.69	1,279	.09	11	.01	Pay patients.
Seamen and keepers, Lighthouse Service.	14,125	.71	10,613	.73	289	.17	Medical supplies also furnished to lighthouse vessels.
Civilian Conservation Corps.	70,388	3.51	851	.06	197	.12	Patients of the Civilian Conservation Corps.
Civil Works Administration.	1,640	.08	56	-----	23	.01	Patients of the Civil Works Administration.
Works Progress Administration.	132,398	6.61	175,624	12.02	37,664	22.83	Patients of the Works Progress Administration.
Alaska cannery workers leaving United States.	-----	-----	340	.02	3,905	2.37	Vaccinations and other preventive measures.
Pilots and other licenses.	-----	-----	-----	-----	9,024	5.47	For the Steamboat Inspection Service.
Civil Service applicants and employees.	-----	-----	-----	-----	28,177	17.08	For the Civil Service Commission.
Shipping Board.....	-----	-----	-----	-----	175	.11	To determine fitness for sea duty.
All others entitled to treatment.	29,539	1.47	341,900	23.41	14,495	8.78	From Bureau of Fisheries, Army, Navy, Mississippi River Commission, Coast and Geodetic Survey, etc.
Total.....	2,004,154	100.00	1,460,798	100.00	164,980	100.00	

DENTAL TREATMENT

During the fiscal year 194,437 beneficiaries were given dental treatment by full-time dental officers. The major items of treatment and a comparison with the preceding year are shown in the following list:

	<i>Fiscal year</i> 1937	<i>Fiscal year</i> 1938
Number of patients treated.....	173,598	194,437
X-rays.....	37,722	40,450
Prophylactic treatments (hours).....	19,077	22,583
Vincent's stomatitis treatments (cases).....	4,930	3,638
Pyorrhea treatments (cases).....	5,237	7,228
Extractions.....	88,506	96,341
Alveolectomies.....	4,632	4,528
Alloy fillings.....	41,918	42,391
Gold inlays.....	1,081	807
Porcelain crowns.....	85	110
Silicate cement fillings.....	18,528	20,060

	<i>Fiscal year</i> 1937	<i>Fiscal year</i> 1938
Dentures (full and partial)-----	9,326	10,589
Fracture cases (hours)-----	1,796	1,328
Number of treatments (outpatient)-----	509,491	521,598
Number of treatments (inpatient)-----	210,075	226,611
Total number of treatments-----	719,566	748,209

The amount of treatment rendered by full-time dental officers shows an increase over last year. In addition, 2,913 beneficiaries were treated at 40 relief stations by contract dentists on a fee basis.

The motorized dental unit continued to provide dental relief for Coast Guard personnel at isolated stations. An additional mobile dental unit will be put into commission early in the fall of 1938.

Dental Surg. C. W. Wekenman is in charge of the clinical dental activities of the Service.

COAST GUARD

The average number of Coast Guard beneficiaries on active duty and retired was 10,014. Medical services furnished in recent years are shown in the following table:

Year	Numerical strength of Coast Guard and medical services given				Average amount of medical services per person		
	Number of Coast Guard personnel	Hospital days	Out-patient treatments	Physical examinations	Hospital days	Out-patient treatments	Physical examinations
1927-----	10,984	76,564	155,977	18,787	6.9	14.2	1.7
1928-----	12,462	85,691	137,971	17,220	6.9	11.0	1.4
1929-----	12,833	88,870	169,697	17,748	6.9	13.2	1.4
1930-----	12,963	90,179	196,334	14,382	6.9	15.1	1.1
1931-----	13,020	86,829	187,063	8,262	6.7	14.4	.6
1932-----	13,189	91,655	198,800	11,481	6.9	15.1	.9
1933-----	13,181	106,126	214,805	9,557	8.0	16.3	.7
1934-----	10,401	88,896	172,510	6,367	8.5	16.6	.6
1935-----	9,413	80,195	151,744	8,966	8.5	16.1	.9
1936-----	10,748	88,325	130,206	5,149	8.2	12.1	.5
1937-----	10,325	91,590	141,939	6,437	8.9	13.7	.6
1938-----	10,014	84,784	121,849	8,234	8.5	12.2	.8

Thirteen medical and dental officers are assigned exclusively to Coast Guard duty and 103 local physicians serve under appointments as acting assistant surgeons to furnish medical and surgical relief and conduct physical examinations of Coast Guard personnel at isolated units remote from any Public Health Service relief station.

As in past years, medical and dental officers have been assigned to the cutters comprising the Bering Sea Patrol Force operating in the north Pacific and Arctic waters and to the cutters on the International Ice Patrol in the north Atlantic. A medical and a dental officer are assigned to duty ashore at the Coast Guard Dispensary, Unalaska, Alaska, in order to render relief to beneficiaries of the Service basing at that port. As in the past the medical officer ashore utilizes the facilities of the Indian Affairs Hospital for providing necessary relief. Full-time medical officers serve on the cutters basing at San Juan, P. R., Honolulu, Hawaii, Cordova and Juneau, Alaska.

The motorized dental unit of the Public Health Service has operated successfully within the Coast Guard districts and has rendered dental relief to a vast number of beneficiaries who otherwise would not receive relief, and has done much to improve the morale of the Coast Guard.

Medical Director H. McG. Robertson served as chief medical officer of the Coast Guard during the greater part of the year. He was relieved during the latter part of June by Medical Director M. C. Guthrie, who is now the representative of the Surgeon General in the Coast Guard and Chief Medical Officer.

EXPENDITURES FOR MAINTENANCE OF MARINE HOSPITALS AND RELIEF STATIONS

The total amount expended from the appropriation "Pay of Personnel and Maintenance of Hospitals, P. H. S. 1938," including those reimbursements which augment the appropriation, classified according to General Accounting Office Bulletin, is shown below:

01 Personal services.....	\$4, 144, 900
0200 Janitor and laundry supplies and X-ray films.....	76, 155
0210 Medical and hospital supplies.....	259, 917
0220 Scientific and educational supplies.....	6, 661
0230 Fuel.....	196, 780
0250 Forage.....	30, 966
0260 Provisions.....	1, 182, 591
0280 Sundry supplies.....	50, 661
03 Subsistence and support of persons (contract care).....	343, 612
0500 Telegraph service.....	1, 522
0510 Telephone service.....	31, 239
06 Travel expense.....	65, 599
07 Freight.....	63, 331
10 Furnishing heat, light, power, and water.....	230, 416
1100 Rent of buildings and offices.....	7, 586
1110 Other rents.....	6, 463
1280 Repairs and parts, motor equipment.....	19, 941
1290 Repairs and alterations, other equipment.....	5, 625
1373 Laundry service.....	23, 789
1375 Ash and garbage removal.....	2, 817
1380 Miscellaneous services.....	4, 695
2250 Burials.....	14, 987
3000 Passenger-carrying vehicles, including ambulances.....	5, 931
3010 Furniture, furnishings, and fixtures.....	157, 900
3020 Scientific and educational equipment.....	69, 249
3050 Other equipment.....	49, 870
Total.....	7, 053, 203

CONSOLIDATED AND DETAILED REPORTS

The following tables give the consolidated and detailed reports for the marine hospitals and relief stations:

TABLE 1.—Number of patients treated annually, 1868 to 1938¹

Fiscal year	Sick and disabled patients furnished relief	Fiscal year	Sick and disabled patients furnished relief	Fiscal year	Sick and disabled patient furnished relief
Prior to reorganization:		After reorganization—Continued.		After reorganization—Continued.	
1868.....	11,535	1892.....	53,610	1916.....	58,357
1869.....	11,356	1893.....	53,317	1917.....	64,022
1870.....	10,560	1894.....	52,803	1918.....	71,614
After reorganization:		1895.....	52,043	1919.....	79,863
1871.....	14,256	1896.....	53,804	1920.....	110,907
1872.....	13,156	1897.....	54,477	1921.....	144,344
1873.....	13,529	1898.....	52,709	1922.....	153,633
1874.....	14,356	1899.....	55,489	1923.....	126,956
1875.....	15,009	1900.....	56,355	1924.....	159,686
1876.....	16,808	1901.....	58,851	1925.....	204,944
1877.....	15,175	1902.....	56,810	1926.....	245,140
1878.....	18,223	1903.....	58,573	1927.....	249,973
1879.....	20,922	1904.....	58,556	1928.....	240,592
1880.....	24,860	1905.....	57,013	1929.....	260,552
1881.....	32,613	1906.....	54,363	1930.....	279,350
1882.....	36,184	1907.....	55,129	1931.....	259,364
1883.....	40,195	1908.....	54,801	1932.....	257,208
1884.....	44,761	1909.....	53,704	1933.....	294,101
1885.....	41,714	1910.....	51,443	1934.....	304,439
1886.....	43,822	1911.....	52,209	1935.....	329,556
1887.....	45,314	1912.....	51,078	1936.....	327,245
1888.....	48,203	1913.....	50,604	1937.....	350,356
1889.....	49,518	1914.....	53,226	1938.....	560,973
1890.....	50,671	1915.....	55,782		
1891.....	52,992				

¹ These figures do not include patients treated in connection with veterans' relief activities of the Service, as follows: 1918, 192; 1919, 13,856; 1920, 279,036; 1921, 667,832; 1922, 242,379; 1923, 9,704; 1924, 3,414; 1925, 4,360; 1926, 3,749; 1927, 2,830; 1928, 3,448; 1929, 4,907; 1930, 6,817; 1931, 9,278; 1932, 9,667; 1933, 8,377; 1934, 716; 1935, 2,448; 1936, 3,970; 1937, 5,424; and 1938, 5,958.

² In this year, and subsequently, the practice of recounting out-patients applying for treatment in more than 1 calendar month was discontinued.

TABLE 2.—Transactions at United States marine hospitals and other relief stations

Hospital or relief station	Total number of patients treated	Number of patients treated in hospitals	Died	Patients remaining in hospitals June 30, 1938	Number of days relief in hospitals	Number of patients furnished office relief	Number of times office relief was furnished	Number of physical examinations
Grand total.....	566,931	60,403	1,530	5,262	2,004,154	506,525	1,460,798	164,950
FIRST-CLASS STATIONS								
Marine hospitals								
Baltimore, Md.....	15,729	4,186	157	317	129,380	11,543	77,615	7,513
Boston, Mass.....	13,155	2,148	34	159	59,942	11,007	48,891	8,656
Buffalo, N. Y.....	5,202	871	23	61	23,132	4,331	27,355	3,224
Carville, La.....	1,159	424	36	349	132,331	735	1,416	5
Chicago, Ill.....	10,677	2,392	30	168	64,758	8,285	33,940	8,102
Cleveland, Ohio.....	11,553	2,878	92	225	81,466	8,705	32,027	3,760
Detroit, Mich.....	6,119	2,355	186	245	87,267	3,764	17,892	3,953
Ellis Island, N. Y.....	5,400	2,510	68	355	121,117	2,890	7,299	156
Evansville, Ind.....	1,435	705	15	60	22,058	730	2,941	240
Fort Stanton, N. Mex.....	2,035	328	23	178	63,150	1,707	7,916	159
Galveston, Tex.....	10,417	2,602	50	160	60,574	7,815	29,271	5,481
Key West, Fla.....	1,761	646	23	40	16,422	1,115	6,572	133
Louisville, Ky.....	2,060	1,133	21	79	30,715	927	4,982	817

TABLE 2.—Transactions at United States marine hospitals and other relief stations—Continued

Hospital or relief station	Total number of patients treated	Number of patients treated in hospitals	Died	Patients remaining in hospitals June 30, 1938	Number of days relief in hospitals	Number of patients furnished office relief	Number of times office relief was furnished	Number of physical examinations
FIRST-CLASS STATIONS—CON.								
<i>Marine hospitals—Continued</i>								
Memphis, Tenn.....	4, 116	1, 741	17	111	39, 305	2, 375	11, 091	1, 638
Mobile, Ala.....	6, 855	1, 662	27	159	53, 610	5, 193	24, 729	950
New Orleans, La.....	14, 062	5, 228	139	400	156, 708	8, 834	37, 388	4, 593
New York, N. Y.....	44, 157					44, 157	262, 868	31, 659
Norfolk, Va.....	11, 875	3, 176	87	207	82, 811	8, 699	50, 291	3, 817
Pittsburgh, Pa.....	4, 396	1, 146	12	75	26, 911	3, 250	8, 175	2, 843
Portland, Maine.....	1, 787	433	9	49	19, 197	1, 354	18, 032	669
St. Louis, Mo.....	4, 461	1, 003	15	95	35, 193	3, 458	14, 259	3, 762
San Francisco, Calif.....	19, 536	4, 454	109	377	146, 776	15, 082	80, 884	3, 810
Savannah, Ga.....	4, 091	1, 508	45	136	58, 987	2, 583	10, 935	1, 618
Seattle, Wash.....	12, 976	3, 408	130	312	122, 277	9, 568	38, 671	7, 259
Staten Island, N. Y.....	17, 780	7, 657	132	555	222, 596	10, 123	48, 948	3, 895
Vineyard Haven, Mass.....	336	157	6	13	6, 894	179	356	33
Contract overflow hospitals.....	72	72	3	38	12, 807			
Total.....	233, 232	54, 823	1, 439	4, 923	1, 876, 414	178, 409	904, 744	108, 755
SECOND- AND THIRD-CLASS STATIONS								
Aberdeen, Wash.....	487	25	1	1	240	462	962	153
Albany, N. Y.....	200	17		1	158	183	317	713
Anacortes, Wash.....	222	16			77	206	447	93
Apalachicola, Fla.....	27					27	148	14
Ashtabula, Ohio.....	354	20			237	334	979	29
Astoria, Oreg.....	561	35	1		179	526	1, 042	768
Balboa Heights, Canal Zone.....	1, 142	236	2	6	3, 780	906	1, 018	
Bangor, Maine.....	27	3			20	24	40	94
Bath, Maine.....	95					95	163	2
Beaufort, N. C.....	466	56		1	385	410	1, 810	132
Bellingham, Wash.....	213	19			136	194	496	333
Biloxi, Miss.....	419	13	2	1	99	406	669	12
Boothbay Harbor, Maine.....	30					30	60	6
Brunswick, Ga.....	125					125	391	129
Burlington, Iowa.....	212	49		3	915	163	293	45
Cairo, Ill.....	596	86	2		547	510	1, 820	158
Calais, Maine.....								18
Cambridge, Md.....	79	6	1		33	73	140	5
Cape May, N. J.....	1, 699	36		1	153	1, 663	3, 641	79
Charleston, S. C.....	1, 156	71	1	2	914	1, 085	2, 253	404
Charlotte Amalie, Virgin Islands.....	142	6			64	136	407	11
Cincinnati, Ohio.....	73	8			206	65	188	374
Cordova, Alaska.....	321	39		2	521	282	426	13
Corpus Christi, Tex.....	552	51			197	501	900	
Crisfield, Md.....	432	3		1	14	429	774	9
Duluth, Minn.....	601	69	2	2	947	532	851	581
Eastport, Maine.....	49			2		49	133	14
Edenton, N. C.....	21					21	88	1
Elizabeth City, N. C.....	149	4		1	44	145	531	25
El Paso, Tex.....	261	19	1		1, 028	242	1, 492	272
Erie, Pa.....	442	17	1		271	425	1, 136	671
Escanaba, Mich.....	60	12	1	2	87	48	107	3
Eureka, Calif.....	174	22	1		142	152	317	31
Everett, Wash.....	218	32			129	186	337	17
Fall River, Mass.....	165	16		1	88	149	386	64
Gallipolis, Ohio.....	254	18			87	236	645	30
Gary, Ind.....	122					122	184	43
Gloucester, Mass.....	362	10			59	352	1, 105	18
Grand Haven, Mich.....	403	30			333	373	843	272
Green Bay, Wis.....	152	18	1		126	134	493	49
Gulfport, Miss.....	141	3	1		11	138	472	57
Hancock, Mich.....	102	6			26	96	178	41
Honolulu, Territory of Hawaii.....	2, 270	301	6	11	4, 936	1, 960	5, 741	769
Houston, Tex.....	1, 793	85	1	1	256	1, 708	5, 166	366
Indiana Harbor, Ind.....	190	6		1	46	184	221	3
Jacksonville, Fla.....	823	73	3	1	597	750	1, 869	1, 186
Juneau, Alaska.....	364	28	1	2	270	336	443	79
Ketchikan, Alaska.....	1, 125	132	2	5	1, 107	993	1, 919	54
La Crosse, Wis.....	45	12			95	33	63	32
Lewes, Del.....	351	37		1	423	314	848	22

TABLE 2.—*Transactions at United States marine hospitals and other relief stations—Continued*

Hospital or relief station	Total number of patients treated	Number of patients treated in hospitals	Died	Patients remaining in hospitals June 30, 1938	Number of days relief in hospitals	Number of patients furnished office relief	Number of times office relief was furnished	Number of physical examinations
SECOND- AND THIRD-CLASS STATIONS—continued								
Los Angeles, Calif.	4,450	348	2	21	5,680	4,102	12,322	3,276
Ludington, Mich.	201	5			32	196	320	6
Machias, Maine	50					50	102	14
Manila, P. I.	667	54			795	613	1,264	1,062
Manistee, Mich.	111	8	1		49	103	748	30
Manitowoc, Wis.	252	12	1		60	240	491	2
Marquette, Mich.	227	15	1		119	212	463	96
Marshfield, Oreg.	271	33			299	238	376	120
Menominee, Mich.	89	5			40	84	216	23
Miami, Fla.	2,030	137	4	2	783	1,893	5,372	695
Milwaukee, Wis.	1,384	145	2	2	1,613	1,239	2,771	1,342
Morehead City, N. C.	458	36		1	720	422	1,296	8
Muskegon, Mich.	141	8	1		28	133	197	10
Nantucket, Mass.	92	4			21	88	331	8
Nashville, Tenn.	38					38	68	161
Natchez, Miss.	615	42	1	2	404	573	1,446	60
Newark, N. J.	19					19	36	226
New Bedford, Mass.	386	50		2	398	336	631	106
New Bern, N. C.	154	19	1		148	135	214	8
New Haven, Conn.	160	22	1		187	138	216	198
New London, Conn.	1,975	35	2		412	1,940	2,370	183
Newport, Oreg.	137	8			115	129	311	
Newport, R. I.	275	34			807	241	383	48
Newport News, Va.	318					318	631	34
Ogdensburg, N. Y.	114	5			47	109	225	56
Olympia, Wash.	75	9	1		73	66	86	
Oswego, N. Y.	238	21			53	217	385	102
Paducah, Ky.	1,315	8		1	53	1,307	4,138	119
Panama City, Fla.	612	10			71	602	2,012	44
Pensacola, Fla.	531	51	2	1	416	480	1,682	62
Perth Amboy, N. J.	72	2			10	70	136	28
Petersburg, Alaska	254	17		1	144	237	692	
Philadelphia, Pa.	7,853	336	7	9	3,338	7,517	27,546	6,789
Ponce, P. R.	187	30	1	2	456	157	356	9
Port Angeles, Wash.	657	37			112	620	934	60
Port Arthur, Tex.	3,009	5		1	23	3,004	11,038	140
Port Huron, Mich.	311	9			51	302	696	708
Portland, Oreg.	3,451	282	2	14	4,131	3,169	12,300	3,059
Port Townsend, Wash.	98	6			38	92	296	17
Providence, R. I.	534	28	2		225	506	1,178	1,127
Provincetown, Mass.	255					255	912	17
Reedville, Va.	470					470	1,377	10
Richmond, Va.	98	8			86	90	179	45
Rock Island, Ill.	5,253	10		1	94	5,243	20,048	1,580
San Diego, Calif.	1,049	63	1	1	1,586	986	4,017	1,296
Sandusky, Ohio	108	6			17	102	193	30
San Juan, P. R.	1,063	46			626	1,017	3,806	747
San Pedro, Calif.	4,923	428	3	21	5,567	4,495	14,190	3,717
Sault Ste. Marie, Mich.	1,360	128	3	2	1,094	1,232	1,965	90
Seward, Alaska	409	53	2	1	764	356	730	35
Sheboygan, Wis.	75	3		1	12	72	268	13
Sitka, Alaska	142	5			51	137	374	13
South Bend, Wash.	50	11	1		107	39	76	6
Southport, N. C.	1,081	153	2	6	1,813	928	1,248	8
Superior, Wis.	418	46	1	1	548	372	727	34
Tacoma, Wash.	310	8			12	302	877	75
Tampa, Fla.	901	72	2	2	771	829	1,718	757
Toledo, Ohio	793	66		2	1,008	727	1,491	281
Vicksburg, Miss.	380	6			88	374	1,048	161
Washington, D. C.	7,199	212	1	9	3,309	6,987	41,626	16,364
Washington, D. C. (Dental Clinic)	2,124					2,124	17,022	
Washington, N. C.	115	15			105	100	180	3
White Stone, Va.	904					904	3,318	13
Wilmington, N. C.	593	72		3	602	521	1,118	129
Wrangell, Alaska	234	20		2	186	214	455	7
FOURTH-CLASS STATIONS								
Ashland, Wis.	214	22			266	192	433	155
Bay City, Mich.	127	7	1		73	120	273	
Bridgeport, Conn.	33	14	3		140	19	23	

TABLE 2.—*Transactions at United States marine hospitals and other relief stations—Continued*

Hospital or relief station	Total number of patients treated	Number of patients treated in hospitals	Died	Patients remaining in hospitals June 30, 1938	Number of days relief in hospitals	Number of patients furnished office relief	Number of times office relief was furnished	Number of physical examinations
FOURTH-CLASS STATIONS—CON.								
Fort Yukon, Alaska.....	3					3	4	
Hartford, Conn.....	1	1			1			
Nome, Alaska.....	32	1			6	31	37	
Portsmouth, N. H.....	20				69	19	49	
Saginaw, Mich.....	7					7	17	
Wilmingon, Del.....	30	1			17	29	77	
MISCELLANEOUS								
Curtis Bay, Md. (U. S. Coast Guard).....	1,507					1,507	5,959	116
U. S. Coast Guard Academy, New London, Conn.....	1,789	140		2	2,188	1,649	6,839	346
St. Elizabeths Hospital, Washington, D. C.....	196	196	6	176	63,836			
Special acting assistant surgeons for Coast Guard and Lighthouse Service.....	3,941	79	2	2	334	3,862	14,218	890
U. S. Coast Guard vessels and bases.....	6,944					6,944	28,934	469
Emergency medical relief activities, Treasury Department.....	133,071					133,071	136,061	606
Emergency medical relief activities, other agencies.....	101,237					101,237	102,712	
Emergency.....	162	66			430	96	228	2
Total.....	333,699	5,580	91	339	127,740	328,119	556,054	56,225
Grand total.....	566,931	60,403	1,530	5,262	2,004,154	506,528	1,460,798	164,980

TABLE 3.—*Medical services for various classes of beneficiaries*

Beneficiary	Total number of patients treated	Number of patients treated in hospitals	Died	Patients remaining in hospitals June 30, 1938	Number of days relief in hospitals	Number of patients furnished office relief	Number of times office relief was furnished	Number of physical examinations
American seamen.....	179,712	30,790	734	2,850	1,153,053	148,922	639,776	30,968
Foreign seamen.....	1,238	686	14	25	13,725	552	1,279	11
Coast Guard.....	29,086	3,147	20	204	84,784	25,939	121,849	8,284
Coast Guard dependents.....	4,226	282	4	8	2,116	3,944	18,470	60
Bureau of Fisheries.....	87	10			175	77	274	3
Army.....	336	61	5	3	850	275	883	266
Navy and Marine Corps.....	213	74	5	5	887	139	466	63
Mississippi River Commission.....	3					3	7	
Engineer Corps and Army Transport Service.....	8,013	1,551	35	127	46,962	6,462	25,524	2,368
Lighthouse Service.....	3,046	469	24	33	14,125	2,577	10,613	289
Coast and Geodetic Survey.....	747	74	1	4	1,807	673	3,762	430
Employees' Compensation Commission.....	28,433	3,904	21	227	85,024	24,529	117,883	26,376
Veterans' Administration.....	5,958	5,854	522	587	195,767	104	1,056	1,927
Immigration Service.....	3,845	2,117	14	113	42,272	1,728	5,520	1,035
Public Health Service officers and employees.....	13,842	1,358	18	59	20,343	12,484	93,421	3,269
Patients afflicted with leprosy.....	436	427	36	349	132,361	9	57	2
Civilian Conservation Corps.....	3,207	2,671	21	167	70,388	536	851	197
Civil Works Administration.....	125	106		4	1,640	19	56	23
Works Progress Administration.....	47,100	6,500	34	480	132,398	40,600	175,624	37,664
Miscellaneous.....	237,978	322	22	17	5,477	236,956	243,427	51,745
Total.....	566,931	60,403	1,530	5,262	2,004,154	506,528	1,460,798	164,980

TABLE 4.—*Classification of out-patient treatments furnished at United States marine hospitals and other relief stations*

	General medical	Dental	Eye, ear, nose, and throat	Neuropsychiatric	Tuberculosis	Surgical	Veneral diseases	Inoculations and vaccinations	Arsenicals	Physiotherapy and X-ray	Total
Marine hospitals.....	108,442	292,743	45,378	268	618	129,965	74,309	6,570	29,846	216,605	904,744
Other relief stations.....	67,014	26,021	17,494	99	434	92,343	19,015	6,946	8,771	28,925	267,062
Special acting assistant surgeons.....	9,096	248	927	2	1	1,544	149	1,562	180	509	14,218
Coast Guard vessels and bases.....	11,933	7,558	4,056	24	118	6,462	1,711	2,059	342	1,510	35,773
Emergency medical re- lief activities, Treas- ury Department.....	74,914	-----	21,467	-----	-----	39,680	-----	-----	-----	-----	136,061
Emergency medical re- lief activities, other agencies.....	62,163	-----	21,457	-----	-----	19,092	-----	-----	-----	-----	102,712
Emergency.....	228	-----	-----	-----	-----	-----	-----	-----	-----	-----	228
Total.....	333,790	326,570	110,779	393	1,171	289,086	95,184	17,137	39,139	247,549	1,460,798

DIVISION OF VENEREAL DISEASES

Asst. Surg. Gen. R. A. VONDERLEHR in charge

THE VENEREAL DISEASE CONTROL ACT

The Venereal Disease Control Act signed by the President on May 24, 1938, established the movement to control syphilis and gonorrhea in the United States on a permanent, national basis. This legislation authorizes the appropriation of Federal funds not to exceed specified sums for the fiscal years 1939, 1940, and 1941, and thereafter such sums as may be deemed necessary to carry out the purposes of the Act. During the closing days of the last session of Congress the sum of \$3,000,000 was made available for the fiscal year 1939 for the purpose of assisting States and political subdivisions of the States in establishing and maintaining adequate measures for the prevention, treatment, and control of the venereal diseases; and for the purpose of making studies, investigations, and demonstrations to develop more effective measures of prevention, treatment, and control of the venereal diseases, including the training of personnel.

In the past, because of the great prevalence of venereal diseases and the limited funds appropriated, many State departments of health were unable to cope with the problem. The efforts of more fortunate States which were able to establish satisfactory measures for the control of the venereal diseases were to a large extent nullified by the ingress of venereally infected persons from adjacent communities.

Federal grants to the States, which are now authorized for a period of years, will equalize to some extent the distribution of funds for the control of venereal diseases and will enable the less wealthy States to establish more successful measures for the control of syphilis and gonorrhea.

The laboratory, clinical, and field investigations which are contemplated through the use of funds appropriated under this act will aid in the discovery of more efficient and more economical methods for the control of the venereal diseases.

If success in control of syphilis and gonorrhea is to be achieved, measures against these diseases must be Nation-wide, aggressive, and sustained. The newly enacted Venereal Disease Control Law makes possible a continuous scientific, coordinated attack which undoubtedly will materially reduce the incidence of syphilis and gonorrhea in the United States within the next decade.

EVALUATION OF SERODIAGNOSTIC TESTS FOR SYPHILIS

In accordance with the recommendations of the Committee for the Evaluation of Serodiagnostic Tests for Syphilis, the State public health laboratories were afforded an opportunity to evaluate their respective serodiagnostic procedures. The methods employed for the

selection of donors, the collection and distribution of blood specimens, and analysis of reports followed closely the procedure used in previous evaluation studies, details of which have been published in reports of the committee. The blood specimens were selected in the department of dermatology and syphilology of the University of Virginia Hospital and the department of dermatology of the University of Illinois College of Medicine. A total of 100 normal, presumably nonsyphilitic and 207 syphilitic donors considered suitable for the purpose, served as a basis for the study. Forty-six laboratories representing 44 States and the District of Columbia participated. A report was returned to each participating laboratory setting forth its number and percentage of positive, doubtful, and negative reports in a direct comparison with the reports from identical specimens returned by a control laboratory. Each laboratory also received its specificity and sensitivity percentage ratings. Because of the importance attached to serodiagnostic tests in the diagnosis of syphilis this annual evaluation study of such tests as performed in State laboratories is one of the most important functions of the Division of Venereal Diseases.

COOPERATIVE CLINICAL GROUP

Work with the Cooperative Clinical Group which has been actively carried on for the past 9 years has continued. During the year two studies have been completed.

Tabes dorsalis.—This study was undertaken for the purpose of determining the most effective treatment procedure in tabes dorsalis. The various methods of treatment have been evaluated, and a detailed report was presented at the meeting of the American Medical Association, June 13–17, 1938.

Nonspecific therapy in treatment of neurosyphilis.—With the object of determining the effectiveness of the various types of nonspecific therapy in neurosyphilis, 3,300 case records of patients given this form of treatment were studied. All of these records have been abstracted and coded, and a preliminary evaluation of the material has been presented for analysis to the clinicians of the nonspecific therapy group.

Investigation of the following projects has been continued:

Conjugal syphilis.—The purpose of this study is to determine the period of communicability of syphilis. The material includes approximately 3,000 case records. Abstracts of these records have been completed and work on the final analysis of this material is in progress.

Prevention of prenatal syphilis.—The objective of this study is the determination of the significance of the blood test during the first few months of life in terms of freedom from subsequent late disabling manifestations of syphilis. It includes a review of the physical condition of approximately 2,500 children who had a negative blood test at birth although they were born of mothers with syphilis. Abstracts of the medical records of these cases have been completed.

Efficacy of modern treatment in early syphilis.—In order to enable medical authorities to speak with complete confidence on the effectiveness of modern treatment for early syphilis those patients who have

received the standard therapy for early syphilis are being kept under close observation and study.

Ocular syphilis with special reference to interstitial keratitis.—This study has for its purpose the development of a treatment procedure which will obtain the maximum results. At the present time all available case records are being abstracted.

Cardiovascular syphilis.—Work on this study, which has for its objective the establishment of satisfactory criteria of diagnosis, is being carried on to the extent that clinical material is available.

A new study begun during the year is the correlation of autopsy and clinical data. The purpose of this study is to determine the frequency with which syphilis is a primary or contributory cause of death. During the past year approximately 6,000 of the 10,000 autopsy reports from one institution of the Cooperative Clinical Group have been reviewed and abstracted.

COOPERATION WITH OTHER AGENCIES

Experience indicates that medical knowledge pertaining to the diagnosis and control of venereal diseases can be advanced most effectively through the method of group investigation.

During the year several additional clinics and universities collaborated with the Division of Venereal Diseases and the original Cooperative Clinical Group in the study of special problems related to the control of venereal diseases.

The response of the spinal fluid in syphilis to varying amounts of therapy was investigated. This study, which was undertaken to determine the frequency with which examination of the spinal fluid should be made as a guide to prognosis, has been completed and the report was presented at the meeting of the American Medical Association, June 13–17, 1938.

Observations on the treatment of syphilis by the administration of certain lipoids were continued.

An advisory committee to the United States Public Health Service, composed of members of the American Neisserian Medical Society, was appointed for the purpose of developing more effective measures for the control of gonorrhea. Recommendations for a control program have been drawn up and were printed in Venereal Disease Information, January 1938.

A review of the literature on the gonococcus and gonococcal infections for the years 1936–37 has been prepared for publication and will be issued soon.

The dangers and the effectiveness of sulfanilamide in the treatment of gonorrhea in the male will be made the subject of a special study. Forms and instructions for this study have been agreed upon and are now in use by the clinic directors of five institutions.

At the syphilis research center, Johns Hopkins Hospital, attention has been directed largely to the study of the mechanism of the therapeutic action of bismuth and arsphenamine compounds in syphilis. It has been found that bismuth is directly spirocheticidal *in vitro*, and that its therapeutic action in syphilis is probably due primarily to this direct action. Contrary to previous reports, arsphenamine, neoarsphenamine, and silver arsphenamine also immobilize and kill

Spirochaeta pallida in vitro. In the case of neoarsphenamine, this activity is due almost entirely to its oxidation to other more active compounds. In the case of arsphenamine and silver arsphenamine, even with rigid exclusion of oxygen, there is a residual antispirochetal activity which is presumably due to the arsphenamine *per se*.

The activity of different lots of the several arsphenamine derivatives has been found to vary widely. Experiments are now in progress to ascertain whether there is any correlation between the antispirochetal activity of the several arsphenamines as determined *in vitro* and their therapeutic activity in syphilitic rabbits. A large series of arsenicals is being synthesized in an effort to ascertain whether there is any systematic correlation between chemical structure and antispirochetal activity.

Studies have been begun on the significance of positive serologic results in individuals who present no history or clinical evidence of syphilitic infection.

Grateful acknowledgment is made to the Rockefeller Foundation and the Milbank Memorial Fund for their financial assistance which made possible special studies related to the control of venereal diseases.

The American Social Hygiene Association made an immeasurably valuable contribution toward the control of venereal diseases through the dissemination of information, the stimulation of public interest, and the coordination of voluntary effort in this field of endeavor.

COOPERATIVE WORK WITH THE STATE HEALTH DEPARTMENTS

In order to comply with the many requests received from State health departments for advisory assistance in connection with the organization and expansion of their venereal disease activities, specially trained commissioned officers have been assigned as regional venereal disease control officers. In addition commissioned officers have been assigned to act as advisory venereal disease control officers in three of the States in order to permit the State health officer to train a regular member of his staff to fill this important position. Commissioned officers have also been assigned for duty with the New York City and Chicago Health Departments to coordinate venereal disease control activities in these large metropolitan areas.

Through the use of Social Security funds the facilities for the training of physicians in the clinical management and public health control of syphilis and gonorrhea, which were established last year at several clinics and universities, were continued. A number of State health officers availed themselves of this opportunity to obtain better qualified personnel and provided stipends and travel expenses for a select group of physicians who will act as venereal disease control officers, directors of venereal disease clinics, or special consultants.

The Chief of the Division and members of his staff found it difficult to comply with the many requests for the presentation of scientific papers before medical groups. The pressure of other duties made it necessary to decline numerous invitations to present talks before interested civic organizations.

The expansion of venereal disease control activities in a number of States and localities is evidenced by the increase in the number of

new cases of syphilis and gonorrhea reported to State health departments, the increase in the number of clinics which are submitting morbidity reports, the increase in the number of cases discharged as arrested or cured, and the increase in the total number of treatments administered.

CONTROL OF SYPHILIS IN RURAL AREAS

Provision of treatment for indigent persons residing in rural areas has been a difficult problem for State and local health departments. In an effort to ascertain the most practical and most economical methods of providing treatment for venereal diseases in such areas, the Public Health Service, in cooperation with the Georgia State Department of Public Health and the Brunswick District Health Department, is conducting a field study on the use of a traveling treatment unit in Camden, Glynn, and McIntosh Counties in southern Georgia.

In these counties workers in the fishing and the turpentine and lumber industries are widely dispersed, doctors are few, and the income of neither whites nor Negroes is sufficient for adequate modern syphilis treatment.

The trailer clinic travels nearly a thousand miles a week and treats almost a thousand patients. At 20 stops, at turpentine stills, cross-road stores, and school houses, patients gather for the weekly clinic. Laboratory service for the necessary blood testing is provided at the branch State laboratory in Waycross, Ga.

Judgment on this demonstration project cannot be given at this time, though there are many indications that the experiment will prove a success.

UNTREATED SYPHILIS IN THE NEGRO

The study of untreated syphilis in a group of male Negroes residing in Macon County, Ala., was continued during the year. The purpose of this study is to record observations over a period of years on a group of 400 syphilitic male Negroes who have received no treatment and a comparable group who have received adequate therapy.

The Alabama State Department of Health, the Macon County Health Department, and the Tuskegee Institute are cooperating with the Public Health Service in making annual physical examinations on members of this group and recording illnesses which have occurred throughout the year.

The Milbank Memorial Fund continued its valuable contribution in the form of a grant for the purpose of obtaining necropsy studies. During the year, 19 deaths occurred and pathologic examinations were made in 12 of these cases.

Plans have been completed for transferring the supervision of this study to a commissioned officer who is specially trained in the diagnosis of cardiovascular syphilis. During the next year surviving patients in the group will be made the subject of special study, including a complete physical examination and roentgenograms of the heart and great blood vessels.

No similar study of the effects of untreated syphilis over a period of years, correlated with the pathologic findings at death, has ever

been made. Final analysis of this study at some time in the future should provide a valuable contribution to medical science.

PREVALENCE STUDIES

During the year, the United States Public Health Service was requested to cooperate in making a survey of the medical sources treating venereal diseases in various communities. The most extensive survey made was in Chicago, Ill. Every case of syphilis was included, provided the patient had been under authorized medical care for syphilis. It was found that 15,500 patients with syphilis each year seek authorized medical care in the city of Chicago. A great many persons fail to seek treatment during the early stages of the disease, and 60 to 80 percent of them had had no treatment prior to admission for treatment of a late manifestation of syphilis. Furthermore, of the small percentage of clinic population who sought treatment during the early stages, only about one-half remained long enough to secure the minimum treatment necessary to control syphilis. It was estimated that there were approximately three to four times as many individuals in Chicago who were in need of medical care for syphilis as had actually sought authorized treatment.

Since this survey, the health authorities of Chicago have been waging an even more vigorous campaign against the disease, and during the past few months a mechanical reporting system described by the Public Health Service has been installed, which will periodically make available data on the extent of the problem and serve as a measure of and aid in present-day treatment and control methods.

The Public Health Service also cooperated in a survey of venereal disease in Ingham County, Mich., which was financed largely by the Ingham County Medical Society. This survey included the usual census of cases of venereal disease actually under observation by any authorized source of treatment, and a novel plan, that of a routine blood test for syphilis on all patients coming under the care of each private physician in active practice in Ingham County during a 60-day period. The use of these two methods offered an opportunity to establish a ratio of infected persons under treatment to the potential treatment load. Some 7,600 blood samples were examined during a period of 2 months, as compared with 1,770 in the preceding 2 months. One hundred additional persons with syphilis were discovered by this means.

On presentation of the results of this survey, the Ingham County Medical Society adopted a venereal disease program designed to improve the control of syphilis in its community.

A resurvey was made in Baltimore and five contiguous counties of Maryland. The results of this survey are not yet available.

EDUCATIONAL ACTIVITIES

During the past year many requests for informative literature were received from community organizations and influential citizens, such as chambers of commerce, women's clubs, civic clubs, parent-teacher associations, educators, newspapers, clergymen, Congressmen, and Senators. Letters from both patients and physicians requesting advice have continued to increase during the year. The motion picture

film "Syphilis, Its Nature, Prevention and Treatment" was in great demand.

New exhibit material prepared by the Division either alone or in cooperation with the American Medical Association and the Works Progress Administration consists of:

Two sets of 10 colored posters on the prevention and treatment of prenatal syphilis and the diagnosis and treatment of latent and late syphilis.

Seventeen charts portraying the results obtained by various methods of treatment in tabes.

A series of posters and lantern slides on the diagnosis of syphilis.

A series of eight enlarged, mounted photographs of actual laboratory and treatment procedures in early syphilis.

In cooperation with the Department of Agriculture, the Division of Venereal Diseases is producing a silent 16-mm motion-picture film portraying the work being done by the traveling clinic in southern Georgia.

Requests for articles continued to come in from magazines, newspapers, and trade journals, and many such articles suitable for the general reader were prepared in the Division.

Venereal Disease Information continues to enjoy the distinction of having the largest paid subscription list of any Government publication. The monthly average of paid subscriptions was 11,047, an increase of 2,980 over the preceding year. The average distribution of free copies was 2,888, an increase of 193 over the fiscal year 1937. A new venereal disease folder "Syphilis—Its Cause, Its Spread, Its Cure," the first of a proposed series, met with favorable response, 40,000 copies being distributed free to health officers, private physicians, and others. About 400,000 copies have been purchased from the Government Printing Office by industrial organizations, private physicians, and State health departments. One State health department placed a single order for 100,000 copies.

During the year a total of 14,673 individual requests for informative literature was received and 10,942 were complied with by the Division of Venereal Diseases. The remaining 3,731 requests were referred to the various State health departments.

The total number of publications distributed, including venereal disease bulletins, the free stock of Venereal Disease Information, reprints from Venereal Disease Information, and popular articles, was 198,784. In addition, 493 sets of syphilis posters were provided without charge and motion-picture films on syphilis were lent to 173 organizations.

The following new publications were issued during the fiscal year, ended June 30, 1938:

REPRINTS FROM VENEREAL DISEASE INFORMATION

- No. 67. Does this describe your venereal disease clinic? By Thomas B. Mc-Kneely. 8 pages.
- No. 68. Delayed dark-field examination. By J. F. Mahoney and K. K. Bryant. 6 pages.
- No. 69. A microflocculation test for syphilis. By John A. V. Davies. 8 pages.
- No. 70. Control of syphilis. By Thomas Parran. 7 pages.
- No. 71. A tentative death curve for acquired syphilis in white and colored males in the United States. By Lida J. Usilton and John Rice Miner. 9 pages.

- No. 72. Serodiagnostic tests for syphilis in 39 State laboratories. By Thomas Parran, H. H. Hazen, J. F. Mahoney, Arthur H. Sanford, F. E. Senear, Walter M. Simpson, and R. A. Vonderlehr. 7 pages.
- No. 73. Teaching of venereal disease control in medical schools. By Paul A. O'Leary. 5 pages.
- No. 74. The principles of case finding. By Julia MacPhillips. 4 pages.
- No. 75. A traveling clinic. 5 pages.
- No. 76. Citizen support in syphilis control. By Homer Folks. 6 pages.
- No. 77. Creating and maintaining the interest of social workers in a program for the control of gonorrhea and syphilis. By Gladys L. Crain. 9 pages.
- No. 78. Sulfanilamide therapy in gonococcal infections. By C. J. Van Slyke, J. Durward Thayer, and J. F. Mahoney. 8 pages.
- No. 79. Progress in venereal disease control in the United States July 1, 1937. 4 pages.
- No. 80. Recommendations for a gonorrhea control program. 5 pages.
- No. 81. Criteria governing the use of antisymphilitic drugs. By H. N. Cole. 9 pages.
- No. 82. The control of gonorrhea. By Ambrose J. King. 4 pages.
- No. 83. Syphilis epidemiology applied. By Norman R. Ingraham, Jr. 13 pages.
- No. 84. The control of venereal diseases. By Thomas Anwyl-Davies. 8 pages.
- No. 85. The value of consultation service in syphilis clinics. By Hugh J. Morgan. 4 pages.
- No. 86. Cooperation of the private physician in the control of prenatal syphilis. By P. C. Jeans. 3 pages.
- No. 87. Postgraduate education in syphilis. By Thomas B. Turner. 4 pages.
- No. 88. Importance of treatment in control of congenital syphilis. By Norman R. Ingraham, Jr. 5 pages.

SUPPLEMENTS TO VENEREAL DISEASE INFORMATION

- No. 4. Hospitals and dispensaries for the treatment of venereal diseases. 29 pages.
- No. 5. The diagnosis of syphilis by the general practitioner. By Joseph Earle Moore. 36 pages.
- No. 6. Management of syphilis in general practice. By Joseph Earle Moore in collaboration with Harold N. Cole, Paul A. O'Leary, Thomas Parran, John H. Stokes, and R. A. Vonderlehr. 61 pages.

VENEREAL DISEASE FOLDERS

- No. 1. Syphilis: Its Cause, Its Spread, Its Cure. 8 pages.

VENEREAL DISEASE RESEARCH LABORATORY, STAPLETON, STATEN ISLAND, NEW YORK

The scope of activities at the Venereal Disease Research Laboratory was greatly expanded during the past year. In addition to carrying on basic scientific investigations, the laboratory participated in a number of field studies pertaining to the serodiagnosis of syphilis and the therapeutic efficacy of sulfanilamide in gonorrheal infections.

Surveys of the serodiagnostic tests as carried out in the United States Marine Hospitals in Baltimore and Norfolk and the New York City Health Department were completed and detailed reports submitted.

The director of the laboratory supervised and coordinated the comparative study of serodiagnostic tests for syphilis, as performed in 46 laboratories representing 44 States and the District of Columbia. The use of dried or frozen serum in conducting such comparative studies in the future is at present under consideration. If this method is found practicable it will eliminate the collection of large amounts of blood

from donors and the transmission of whole blood specimens by mail to participating laboratories.

In an effort to assist in the standardization of laboratory procedures in the United States, the Venereal Disease Research Laboratory has made its facilities available for the training of personnel from State laboratories and is cooperating with a group of leading serologists in obtaining data which will be of assistance in accomplishing this objective.

For the purpose of determining the influence exerted by tuberculous diseases upon serodiagnostic tests for syphilis, the Venereal Disease Research Laboratory participated in a cooperative study sponsored by the National Tuberculosis Association, the Committee on Evaluation of Serodiagnostic Tests for Syphilis, the American Society for Clinical Pathologists, and the Public Health Service. The findings of this study indicate that tuberculous toxemia may be a cause of false doubtful or false positive reactions for syphilis. This should not, however, present a major problem in the clinical interpretation of results obtained with carefully conducted serodiagnostic procedures.

The unique facilities which this laboratory enjoys in having access to 160 hospital beds devoted to venereal disease patients and a large group of carefully controlled patients incarcerated in correctional institutions of New York City were used to good advantage in conducting studies of the therapeutic efficacy of sulfanilamide in gonorrheal infections. Detailed reports of these studies have been published and are a source of valuable scientific information on this new and promising treatment for gonorrhea.

Because of the paramount importance of prophylaxis in syphilis, from the standpoint of ultimate control of the disease, the major experimental efforts of the laboratory were centered in developing an effective prophylactic agent. Previous studies have demonstrated that the creation of an acid environment in the exposed area apparently prevented penetration by the spirochetes in about 60 percent of the animals, and also that certain alcohols act as an efficient spirocheticide. The sulfonates of these alcohols have been used as a base in producing preparations suitable for local application, and their efficacy in preventing syphilis infections in rabbits is being tested.

Investigations previously begun in connection with the important problem of seminal transmission of syphilis have been temporarily discontinued because of the inability to obtain specimens of semen. This study will be resumed at the first opportunity. In the meantime a study of the spirochete localization in the penile tissues of latent syphilitic rabbits is being carried on. This study parallels rather closely that of seminal transmission in that it has as its objective the determining of the possibility that the syphilis organism may migrate through the urethral mucous membrane in order to effect an escape from the host, much in the same manner in which it obtains ingress.

Further work, looking toward the possible refinement of two complement fixation procedures in the diagnosis of gonorrhea, has been carried out. Slight if any improvement in the character of the results has been noted by any of the modifications used.

The possibility of false positive reactions in the complement fixation test for gonorrhea renders it difficult to place a high degree of reliance upon results obtained. Some preliminary work looking to-

ward the development of a flocculation reaction for gonococcal infections is being carried on. The results obtained so far do not appear promising, although much further work in this field remains to be done.

Attempts have been made to cultivate the Ducrey organisms for the purpose of preparing antigens for use in the diagnosis of chancroidal infections by skin tests. Initial attempts at cultivation have not been successful, but efforts will be continued until strains suitable for antigen production have been isolated.

The facilities of this laboratory have been taxed to the utmost during the past year in an attempt to correlate clinical and field studies with basic experimental investigations. Such a correlation is essential for the advance of medical science. Projected studies during the next fiscal year looking toward the development of more effective and more economical methods in the diagnosis and treatment of syphilis and gonorrhea will necessitate an increase in laboratory space, equipment, and personnel.

THE VENEREAL DISEASE MEDICAL CENTER, HOT SPRINGS NATIONAL PARK, ARKANSAS

This Medical Center is divided into two parts—an out-patient clinic, to which medically indigent patients come who have sufficient funds available to provide meager lodgings for themselves and an infirmary operated for patients who are totally indigent. The out-patient clinic, organized in 1921, has always been operated with funds appropriated for the expenses of the Division of Venereal Diseases. In 1935 the Transient Bureau of the Federal Emergency Relief Administration constructed a camp for transients near Hot Springs, and the Public Health Service cooperated in the treatment of those transients who were infected with venereal disease and who were cared for in this camp. When the transient activities of the Federal Government were discontinued, the Administrator of the Emergency Relief Administration in Arkansas agreed to make available during the fiscal year 1937 a sufficient amount from balances remaining from former Federal relief grants to the State of Arkansas for the continuation of this camp as an infirmary solely for the care of totally indigent patients infected with syphilis and gonorrhea. Full administrative responsibility for this service was turned over to the Public Health Service. This arrangement was continued until September 1, 1937, when, under the third deficiency appropriation act, approved August 25, 1937, \$163,266 was transferred from unobligated balances of funds heretofore allocated to the Federal Emergency Relief Administration to the Treasury Department, Public Health Service, for the maintenance and operation of the infirmary for the remaining 10 months of the fiscal year 1938.

On September 30, 1937, the Emergency Relief Administration of Arkansas transferred all equipment, instruments, and subsistence supplies located at the infirmary to the Public Health Service. Through a Works Progress Administration project the infirmary buildings were renovated and a woven wire fence was erected around the property. Plans have been made to continue the improvement of the infirmary during the fiscal year 1939. A storage warehouse, garage, and animal house are to be constructed and the hospital building will be enlarged.

The Venereal Disease Medical Center, in cooperation with the Government free bath house of the National Park Service made a contribution of inestimable value toward preventing the interstate spread of venereal diseases. Every State except New Hampshire and Vermont was represented among the 6,486 indigent persons who were given medical treatment; 3,941, or 61 percent, of the applicants were afflicted with venereal disease. Since 399 patients had two or more specific infections, there was a total of 4,340 cases of venereal disease. Among the various infections recorded there were 2,863 cases of syphilis, 1,078 cases of gonorrhea, 88 chancroid, 22 lymphopathia venereum, and 12 granuloma inguinale.

A total of 108,337 treatments was administered, classified as follows: Arsphenamine injections, 21,301; other intravenous injections, 4,650; intramuscular injections, 48,701; and 33,685 treatments for gonorrhea. Eighty-one patients were given 448 treatments in the Kettering hypertherm cabinet and 51 patients were inoculated with malaria. In the Government free bath house, 85,913 baths were given. Toward the end of the fiscal year treatment by local hyperpyrexia was utilized in cases of pelvic inflammatory disease and in prostatitis. Dental treatments, consisting of oral prophylaxis and extractions, to the number of 9,190 were given.

During the year 78,621 laboratory examinations were performed. These included serologic tests, dark-field examinations, microscopic slide examinations, urine analyses, and other special diagnostic tests. The spinal fluids of 977 patients were examined during the year. In December 1937 the Kahn quantitative serologic test was instituted in the laboratory. This test is now being employed routinely in treated cases of syphilis.

Information was furnished the proper State health officer with regard to 599 sources of infection or supposed contacts of patients admitted to the clinic. Four hundred and thirty-one follow-up letters were written notifying State health officers of patients who had lapsed in their treatments and were considered potentially dangerous to the public health. Out of a total of 1,030 notifications to health officers, 317 responses were received by the clinic, 126 of which indicated that the persons in question had been located and appropriate action taken.

In cooperation with several State boards of health, 31 health officers and private physicians received one month's training in the diagnosis and clinical management of the venereal diseases. In addition to these a number of physicians and medical social workers observed the activities of the medical center for shorter periods of time. Speakers were provided from the clinic staff for 21 medical and civic groups. On one occasion a clinic was conducted for 500 high school boys at which venereal disease lesions were demonstrated.

Through the cooperation and assistance of the National Park Service needed improvement and alterations were made in the clinic which is located in the Government free bathhouse building.

During the year, 2,231 indigent persons were afforded infirmary care at the medical center. Nine hundred and five persons were given hospitalization for certain complications of the venereal diseases or for serious reactions from treatment. Twelve major and numerous minor operations were performed in the infirmary. Twenty-two in-

infants were delivered from syphilitic mothers and only one of these showed evidence of prenatal syphilis. The mother of this infant did not register at the center until 2 weeks before term.

SYPHILIS CONTROL IN INDUSTRY

Work on syphilis control in industry was started in November 1937 under the direction of a commissioned officer with special training in industrial hygiene. A control program has been presented to manufacturers which proposes that they accept positive cases for employment and retain the positive cases already employed provided these individuals obtain adequate treatment. Positive cases are referred by plant physicians to the family physicians for a check on the diagnosis and for treatment. If the worker's financial condition is such that he is unable to pay for treatment, the plant physician arranges with suitable clinics to care for him. The program has been received with enthusiasm by a number of industrial organizations and in one plant over 400 workers are being treated for syphilis.

The State and local health departments participate in the programs in each locality. They contribute free diagnostic laboratory service and assume leadership in the educational programs which are necessary before the blood tests are made.

INSTITUTIONS AND AGENCIES COOPERATING WITH THE DIVISION OF VENEREAL DISEASES

FISCAL YEAR 1938

CLINICAL STUDIES OF SYPHILIS

Johns Hopkins University
Baltimore, Md.
University of Pennsylvania
Philadelphia, Pa.
Mayo Clinic
Rochester, Minn.
Western Reserve University
Cleveland, Ohio
Wills Eye Hospital
Philadelphia, Pa.
Vanderbilt University
Nashville, Tenn.
New York Psychiatric Hospital
New York, N. Y.
Fitzsimons General Hospital
Denver, Colo.
University of Virginia Hospital
University, Va.
Howard University
Washington, D. C.
Boston Dispensary
25 Bennet Street
Boston, Mass.
Mount Sinai Hospital
Cleveland, Ohio
Shoemaker Clinic
Cincinnati, Ohio

Miami Valley Hospital
Dayton, Ohio
Central State Hospital
Indianapolis, Ind.
Boston Psychopathic Hospital
Boston, Mass.
Colorado Psychopathic Hospital
Denver, Colo.
Strong Memorial Hospital
Rochester, N. Y.
Henry Ford Hospital
Detroit, Mich.
University of Nebraska
Omaha, Nebr.
University of Illinois
Chicago, Ill.
National Research Council
2101 Constitution Avenue
Washington, D. C.
University of Michigan
Ann Arbor, Mich.
Research Institute of Cutaneous Medicine
2101 Pine Street
Philadelphia, Pa.

CLINICAL STUDIES OF GONORRHEA

Strong Memorial Hospital	Boston Dispensary
Rochester, N. Y.	Boston, Mass.
College of Medical Evangelists	Washington University
Los Angeles, Calif.	St. Louis, Mo.
University of Oklahoma	University of Pennsylvania
Oklahoma City, Okla.	Philadelphia, Pa.
American Neisserian Medical Society	Institutions of the Department of Cor-
113 Bay State Road	rection
Boston, Mass.	New York, N. Y.

FIELD STUDIES IN THE CONTROL OF SYPHILIS

Alabama State Department of Health	Illinois State Department of Health
Montgomery, Ala.	Springfield, Ill.
Macon County Health Department	City Health Department
Tuskegee, Ala.	Chicago, Ill.
Tuskegee Institute	Georgia State Department of Health
Tuskegee, Ala.	Atlanta, Ga.
New York State Health Department	Brunswick District Health Department
Albany, N. Y.	Brunswick, Ga.
City Health Department	Michigan State Department of Health
New York City, N. Y.	Lansing, Mich.
District Health Department	City Health Department
Washington, D. C.	Lansing, Mich.
Ingham County Medical Society	
Lansing, Mich.	

SYPHILIS CONTROL IN INDUSTRY

Illinois Manufacturers' Association	Broome County Tuberculosis and Pub-
Chicago, Ill.	lic Health Association
Department of Health	Binghamton, N. Y.
Peoria, Ill.	City Health Department
Caterpillar Tractor Co.	Toledo, Ohio
Peoria, Ill.	Sullivan County Health Department
Federation of Labor (A. F. of L.)	Kingsport, Tenn.
Peoria, Ill.	Carter-Unicoi Health District
National Safety Council	Elizabethton, Tenn.
Chicago, Ill.	Memphis Chamber of Commerce
Social Hygiene Society	Memphis, Tenn.
Cincinnati, Ohio	Mississippi Board of Health
City Health Department	Jackson, Miss.
Chicago, Ill.	City Health Department
	Pittsburgh, Pa.

OTHER GOVERNMENTAL AGENCIES

National Park Service	Works Progress Administration
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FINANCIAL GRANTS-IN-AID FOR THE STUDY OF SPECIAL PROBLEMS

The Rockefeller Foundation	The Milbank Memorial Fund
New York, N. Y.	New York, N. Y.

The activities of many civic and voluntary organizations throughout the country are ably directed and coordinated by the American Social Hygiene Association, 50 West Fiftieth Street, New York, N. Y.

The National Tuberculosis Association, the Committee on Evaluation of Serodiagnostic Tests for Syphilis, and the American Society for Clinical Pathologists cooperated with the Division of Venereal Diseases in a study to determine the influence exerted by tuberculous diseases upon serodiagnostic tests for syphilis.

TABLE 1.—*Report of State departments of health showing the number of cases of syphilis and gonorrhea reported, the annual rates per 1,000 inhabitants, the amount of arsphenamine distributed, and the laboratory examinations made from July 1, 1937, to June 30, 1938*

State	Number of cases			Annual rate for syphilis and gonorrhea per 1,000 inhabitants	Doses of arsphenamines distributed	Laboratory examinations		
	Syphilis	Gonorrhea	Syphilis and gonorrhea			Serologic tests made	Microscopic examinations for Spirochaeta pallida	Microscopic examinations for gonococcus
Total.....	480, 140	198, 439	378, 579	5. 26	2, 799, 110	3, 598, 198	14, 228	490, 258
Alabama.....	21, 269	4, 142	25, 411	8. 78	162, 149	128, 627	247	21, 554
Arizona ¹	751	931	1, 735	4. 59	5, 175	13, 671	-----	459
Arkansas.....	11, 505	3, 638	15, 143	7. 39	91, 900	114, 333	627	13, 862
California.....	23, 266	18, 917	42, 183	6. 85	439, 890	202, 694	1, 454	58, 621
Colorado.....	1, 303	722	2, 025	1. 89	17, 272	75, 376	7	4, 505
Connecticut.....	2, 718	1, 454	4, 172	2. 40	24, 257	111, 145	99	6, 291
Delaware.....	2, 825	589	3, 414	13. 08	20, 401	18, 454	24	3, 612
District of Columbia.....	2, 607	2, 083	4, 690	7. 48	22, 877	13, 677	240	10, 849
Florida.....	23, 682	2, 931	26, 623	15. 94	6, 156	13, 877	-----	825
Georgia.....	23, 532	5, 214	28, 746	9. 32	169, 080	207, 907	719	7, 809
Idaho.....	547	401	948	1. 92	7, 920	59, 199	21	2, 960
Illinois.....	24, 235	14, 480	38, 715	4. 91	222, 735	176, 407	3, 194	65, 111
Indiana.....	3, 780	1, 244	5, 024	1. 45	59, 944	147, 538	22	7, 799
Iowa.....	3, 927	2, 400	6, 387	2. 50	12, 427	2, 644	21	2, 017
Kansas.....	2, 493	1, 014	3, 507	1. 88	15, 906	53, 727	-----	3, 023
Kentucky.....	8, 142	4, 080	12, 222	4. 19	34, 625	83, 343	-----	-----
Louisiana.....	8, 880	1, 236	10, 116	4. 74	1, 182	87, 574	53	2, 834
Maine.....	668	679	1, 347	1. 57	11, 104	18, 851	29	4, 513
Maryland.....	12, 214	3, 729	15, 943	9. 50	70, 537	22, 642	176	5, 173
Massachusetts.....	5, 890	5, 421	11, 311	2. 56	86, 601	216, 046	-----	14, 352
Michigan.....	12, 344	7, 328	19, 672	4. 07	45, 466	50, 836	2, 202	39, 844
Minnesota.....	3, 432	2, 945	6, 377	2. 40	16, 981	240, 947	18	13, 466
Mississippi.....	26, 825	29, 550	56, 375	27. 87	88, 144	100, 631	5	4, 061
Missouri.....	7, 622	2, 592	10, 214	2. 56	34, 034	48, 595	-----	10, 116
Montana ¹	624	388	1, 012	2. 05	-----	-----	-----	-----
Nebraska.....	920	1, 171	2, 091	1. 53	8, 908	43, 807	17	5, 573
Nevada ²	212	65	277	5. 49	1, 141	3, 828	5	2, 023
New Hampshire.....	251	170	421	. 83	7, 765	17, 361	20	2, 822
New Jersey.....	10, 610	3, 604	14, 214	3. 27	52, 183	97, 854	416	19, 140
New Mexico.....	1, 468	502	1, 970	4. 67	7, 733	50, 787	16	2, 206
New York.....	86, 251	25, 418	111, 669	8. 62	141, 338	302, 664	974	18, 009
North Carolina.....	39, 091	7, 359	46, 450	13. 30	188, 711	270, 784	223	12, 504
North Dakota.....	451	504	955	1. 35	5, 344	38, 458	17	3, 029
Ohio.....	17, 762	5, 095	22, 857	3. 39	71, 963	42, 573	760	14, 546
Oklahoma.....	5, 769	4, 171	9, 940	3. 90	-----	-----	-----	-----
Oregon.....	1, 257	2, 256	3, 513	3. 42	3, 573	14, 464	34	5, 969
Pennsylvania ³	21, 072	2, 986	24, 058	2. 36	177, 305	126, 433	554	17, 951
Rhode Island.....	1, 199	651	1, 850	2. 72	10, 074	54, 326	67	8, 429
South Carolina ¹	4, 072	3, 834	7, 906	4. 60	-----	-----	-----	-----
South Dakota.....	407	314	721	1. 04	6, 120	15, 990	-----	1, 095
Tennessee.....	11, 903	4, 689	16, 592	5. 74	98, 840	63, 959	488	12, 165
Texas.....	19, 881	6, 056	25, 937	4. 20	84, 744	33, 878	365	10, 437
Utah.....	151	252	403	. 78	-----	21, 306	3	1, 886
Vermont.....	214	319	533	1. 39	2, 405	10, 159	12	2, 105
Virginia.....	13, 189	3, 858	17, 047	6. 30	111, 122	71, 324	458	5, 299
Washington.....	3, 797	4, 166	7, 963	4. 80	29, 368	73, 825	132	29, 662
West Virginia.....	4, 332	1, 298	5, 630	3. 02	80, 334	22, 675	442	4, 481
Wisconsin ²	790	1, 480	2, 270	. 78	43, 376	13, 002	67	7, 241
Wyoming ⁴	-----	-----	-----	-----	-----	-----	-----	-----

¹ For 11 months. ² For 6 months. ³ Cases of syphilis in the infectious stage only. ⁴ Not reporting.

TABLE 2.—*Report of 98 correctional and penal institutions cooperating with State departments of health¹*

New cases admitted:	
Syphilis.....	5, 078
Gonorrhea.....	2, 781
Chancroid.....	202
Total.....	8, 061
Cases discharged as arrested or cured.....	3, 921
Treatments given.....	322, 030
Doses of arsphenamines administered.....	64, 706
Serologic tests made.....	50, 851
Microscopic examinations for gonococcus.....	24, 982

¹ Includes 40 prison camps.

TABLE 3.—*Report of 33 State hospitals and other institutions for the treatment of mental diseases, submitted through State departments of health*

New cases admitted:	
Syphilis.....	3, 209
Gonorrhea.....	206
Total.....	3, 415
Cases discharged as arrested or cured.....	2, 440
Treatments given.....	123, 593
Doses of arsphenamines administered.....	45, 741
Serologic tests made.....	25, 841
Microscopic examinations for gonococcus.....	3, 014

TABLE 4.—*Report of 1,122 clinics, furnished through State health departments, July 1, 1937, to June 30, 1938¹*

State	Total monthly reports received	New cases admitted				Cases discharged as arrested or cured	Treatments given	Doses of arsphenamines administered	Serologic tests made	Microscopic examinations for gonococcus
		Total	Syphilis	Gonorrhea	Chancroid					
Total.....	10, 285	197, 303	149, 434	44, 752	3, 117	78, 042	25, 177, 827	1, 854, 735	1, 001, 478	321, 699
Alabama.....	12	17, 947	16, 522	1, 350	75	2, 378	274, 615	162, 149	-----	-----
Arkansas.....	12	3, 017	2, 021	906	90	2, 485	2 189, 700	21, 301	36, 096	12, 212
California.....	668	18, 190	10, 273	6, 967	950	6, 734	480, 270	138, 250	117, 886	51, 160
Connecticut.....	216	1, 437	994	443	-----	830	58, 084	17, 676	7, 561	1, 429
Delaware.....	108	2, 566	2, 003	552	11	432	37, 446	17, 110	4, 859	1, 821
District of Columbia.....	12	4, 674	2, 580	2, 054	40	2, 267	95, 325	22, 877	13, 677	10, 849
Florida ⁴	11	988	668	257	63	133	16, 402	6, 156	13, 877	825
Georgia.....	404	13, 988	12, 124	1, 325	539	2, 566	278, 569	128, 653	53, 558	2, 483
Illinois.....	337	15, 423	9, 662	5, 667	94	25, 544	631, 281	217, 570	158, 684	60, 553
Indiana.....	183	2, 847	1, 768	1, 057	22	1, 357	138, 168	46, 042	15, 216	4, 074
Iowa.....	99	823	416	403	4	499	37, 920	12, 427	2, 644	1, 913
Louisiana.....	12	376	225	151	-----	3	8, 921	1, 179	4, 616	453
Maine.....	291	1, 229	611	604	14	518	30, 138	11, 032	3, 312	1, 272
Maryland.....	619	7, 243	4, 784	1, 982	477	2, 674	167, 682	70, 091	72, 377	4, 799
Michigan.....	144	6, 599	3, 659	2, 804	136	2, 285	204, 273	45, 302	50, 578	39, 735
Minnesota.....	60	883	513	369	1	473	53, 253	8, 118	5, 731	5, 020
Mississippi.....	242	8, 546	8, 413	121	12	581	98, 197	55, 327	24, 630	360
Missouri.....	12	236	140	96	-----	109	3, 771	1, 143	182	133
Nebraska.....	48	672	375	295	2	186	23, 656	5, 089	5, 761	4, 897
Nevada ⁵	2	20	20	-----	-----	-----	192	41	14	-----
New Hampshire.....	60	173	88	85	-----	120	11, 090	2, 880	558	333
New Jersey.....	396	6, 495	4, 463	2, 019	13	7, 286	244, 871	51, 627	44, 030	18, 871
New Mexico ⁶	69	428	398	26	4	7	12, 149	6, 181	3, 842	256
New York.....	1, 483	6, 730	4, 662	2, 068	-----	3, 484	297, 081	95, 621	30, 756	10, 488
North Carolina.....	810	19, 485	17, 558	1, 823	104	2, 914	296, 168	170, 941	97, 272	6, 967
Ohio.....	494	8, 930	6, 210	2, 525	195	3, 146	239, 723	69, 772	39, 989	13, 824
Oregon.....	12	522	323	199	-----	836	20, 815	3, 509	667	820
Pennsylvania.....	1, 606	16, 346	14, 011	2, 283	52	(⁸)	431, 099	151, 432	30, 257	8, 747
Rhode Island.....	85	721	449	268	4	423	32, 863	10, 071	17, 469	3, 605
Tennessee.....	686	10, 104	7, 722	2, 225	157	2, 861	259, 006	93, 534	61, 107	11, 408
Texas ⁷	10	2, 582	2, 038	520	24	937	77, 374	25, 446	4, 679	1, 979
Virginia.....	477	9, 616	8, 476	1, 120	20	1, 002	196, 895	111, 122	71, 036	5, 274
Washington.....	42	1, 793	920	872	1	1, 330	57, 445	17, 462	27, 977	25, 036
West Virginia.....	428	4, 700	3, 709	978	13	1, 046	115, 034	48, 568	17, 628	2, 862
Wisconsin.....	135	974	636	338	-----	596	58, 351	9, 036	13, 002	7, 241

¹ States from which no clinic reports were received and those which have no clinics have been omitted from the above table. They are Arizona, Colorado, Idaho, Kansas, Kentucky, Massachusetts, Montana, North Dakota, Oklahoma, South Carolina, South Dakota, Utah, Vermont, and Wyoming.

² Includes 85,913 baths given at the U. S. Public Health Service Clinic, Hot Springs National Park, Ark.

³ Summarized county reports.

⁴ For 11 months.

⁵ For 2 months.

⁶ For 9 months.

⁷ For 10 months.

⁸ No data.

TABLE 5.—*Report of cooperative clinic activities furnished through State health departments from 1919 to 1938*

Year	Number of clinics reporting	New cases admitted	Total treatments given	Cases discharged as arrested or cured	Treatments per new case admitted
1919.....	167	59,092	527,392	14,278	8.92
1920.....	383	126,131	1,576,542	34,215	12.50
1921.....	442	140,748	2,108,003	55,467	14.98
1922.....	541	141,279	2,045,232	60,169	14.48
1923.....	513	119,217	1,992,631	55,503	16.71
1924.....	504	118,023	2,147,087	51,658	18.19
1925.....	495	110,372	2,088,494	47,828	18.92
1926.....	416	100,776	1,881,380	44,329	18.67
1927.....	425	107,688	1,964,233	44,701	18.24
1928.....	451	110,756	2,174,832	49,487	19.64
1929.....	445	120,315	2,128,417	52,136	17.69
1930.....	477	127,978	2,547,162	55,592	19.90
1931.....	512	143,982	2,847,024	57,665	19.77
1932.....	533	150,906	2,979,730	64,645	19.75
1933.....	572	154,302	3,293,927	65,116	21.15
1934.....	616	129,293	3,085,401	55,905	23.86
1935.....	656	134,720	3,359,632	61,064	24.94
1936.....	713	126,271	3,344,257	63,566	26.48
1937.....	965	149,472	3,757,770	68,515	25.14
1938.....	1,122	197,303	5,177,827	78,042	26.24

TABLE 6.—*Report of the U. S. Public Health Service clinic at Hot Springs National Park, Ark., from July 1, 1937, to June 30, 1938*¹

Total applicants.....	6,486	Gonorrhea (new cases).....	895
Venereal..... ² 3,941		Acute.....	574
Nonvenereal.....	2,281	Chronic.....	321
Did not return.....	264		
Syphilis.....	2,863	Total treatments given.....	194,250
New cases.....	2,021	Arsphenamine.....	21,301
Readmitted cases.....	397	Heavy metal.....	48,701
Rejected.....	445	Other intravenous.....	4,650
Gonorrhea.....	1,078	Gonorrhea.....	33,685
New cases.....	895	Baths.....	85,913
Readmitted cases.....	47	Laboratory examinations.....	78,621
Rejected.....	136	Complement fixation tests.....	18,057
Syphilis (new cases).....	2,021	Precipitation tests.....	18,057
Primary.....	170	Kahn quantitative precipitation tests..... ³	1,049
Secondary.....	539	Icterus indices.....	18,057
Tertiary.....	1,245	Darkfields.....	610
Neuro.....	43	Gonococcus smears.....	12,151
Congenital.....	24	Urine analyses.....	10,129
		Special.....	511

¹ From the annual report of the clinic.² The total of 3,941 venereal disease patients represents 4,340 cases of venereal disease, since 399 patients had both syphilis and gonorrhea or chancroid.³ Quantitative test in certain cases introduced in December 1937.

TABLE 7.—*Report of the U. S. Public Health Service Clinic at Hot Springs National Park, Arkansas, from July 1, 1922, to June 30, 1938*

Year	Number of applicants	Number of cases			Treatments given ¹
		Total venereal diseases	Syphilis	Gonorrhea	
Total.....	95, 115	70, 088	45, 183	24, 905	1, 442, 517
1922.....	2, 720	1, 775	1, 182	593	43, 830
1923.....	3, 389	1, 854	1, 326	528	41, 559
1924.....	3, 676	2, 186	1, 447	739	50, 683
1925.....	3, 411	2, 782	2, 011	771	50, 608
1926.....	3, 570	3, 064	2, 211	853	54, 590
1927.....	4, 757	3, 682	2, 504	1, 178	58, 489
1928.....	5, 467	4, 134	2, 626	1, 508	72, 466
1929.....	5, 265	3, 986	2, 512	1, 474	75, 519
1930.....	5, 704	4, 441	2, 743	1, 698	79, 180
1931.....	4, 881	5, 088	2, 776	2, 312	66, 246
1932.....	5, 106	6, 184	3, 188	2, 996	93, 707
1933.....	4, 036	4, 485	2, 850	1, 635	73, 466
1934.....	6, 682	5, 607	3, 330	2, 277	124, 004
1935.....	14, 946	8, 032	5, 272	2, 760	198, 051
1936.....	8, 490	4, 630	3, 368	1, 262	141, 446
1937.....	6, 806	4, 217	2, 974	1, 243	110, 336
1938.....	6, 209	3, 941	2, 863	1, 078	108, 337

¹ Baths not included.TABLE 8.—*Statistical summary of activities in the control of venereal diseases for the fiscal years 1937 and 1938*

	1938	1937 ¹
<i>Medical activities</i>		
A. Cases of venereal disease reported to State health departments:		
I. Syphilis.....	480, 140	336, 258
II. Gonorrhea.....	198, 439	182, 460
III. Chancroid.....	5, 078	4, 271
Total.....	683, 657	522, 989
B. Doses of arsphenamines distributed by State health departments.....	2, 799, 110	1, 567, 348
C. Clinics:		
I. Clinics reporting to State health departments.....	1, 122	965
II. Report from clinics:		
a. New cases admitted.....	197, 303	150, 127
b. Cases discharged as arrested or cured.....	78, 042	68, 748
c. Treatments given.....	5, 177, 827	3, 781, 666
d. Doses of arsphenamines administered.....	1, 854, 735	1, 151, 675
e. Serologic tests made.....	1, 001, 478	678, 516
f. Microscopic examinations for gonococcus.....	321, 699	263, 416
<i>Educational activities</i>		
A. Publications:		
I. Requests for publications received by the Division.....	14, 673	14, 411
II. Publications distributed:		
a. By the Division to State health departments and others.....	198, 784	75, 913
b. By State health departments.....	2, 480, 797	1, 092, 172
Total.....	2, 679, 581	1, 168, 085
III. Venereal disease publications issued by the Public Health Service.....	25	18
B. Lectures, exhibits and film showings reported by State health departments:		
I. Number.....	4, 192	2, 058
II. Average attendance.....	100	99
C. Motion-picture films lent by the Division.....	173	40
D. Posters distributed, sets.....	493	0

¹ Data for 1937 were changed from previously published figures because of the receipt of additional reports.

TABLE 9.—Annual rates per 1,000 population for syphilis and for gonorrhea in 20 cities with a population of 200,000 or over, as reported by city health officers for the months July 1937 to June 1938, inclusive

City ¹	Annual rates per 1,000 population		City ¹	Annual rates per 1,000 population	
	Syphilis	Gonorrhea		Syphilis	Gonorrhea
Baltimore, Md.....	9.03	2.86	Louisville, Ky.....	10.86	4.42
Birmingham, Ala.....	11.69	3.24	Memphis, Tenn.....	14.05	3.96
Boston, Mass.....	2.89	2.45	New York, N. Y.....	9.45	2.46
Buffalo, N. Y.....	3.22	1.47	Omaha, Nebr.....	2.14	1.82
Chicago, Ill.....	3.69	2.62	Pittsburgh, Pa.....	3.59	.48
Cleveland, Ohio.....	3.17	1.19	Rochester, N. Y.....	1.52	1.68
Columbus, Ohio.....	3.21	.76	St. Louis, Mo.....	4.03	2.08
Dallas, Tex.....	11.14	3.36	San Francisco, Calif.....	3.27	3.80
Dayton, Ohio.....	4.37	.57	Seattle, Wash.....	4.49	4.36
Kansas City, Kans.....	2.14	.15	Washington, D. C.....	4.16	3.32

¹ Cities for which data were available for each month of the fiscal year.

DIVISION OF MENTAL HYGIENE

Asst. Surg. Gen. WALTER L. TREADWAY in charge

The year ending June 30, 1938, marks the eighth full 12-months' activities of the Division of Mental Hygiene. The functions of the Division continued unchanged during the year. They comprised studies of the nature and treatment of drug addiction and the dissemination of information upon the subject; studies of the abusive uses of narcotic drugs; administrative functions incident to the establishment and operation of the narcotic farms; supervising and furnishing medical and psychiatric services for the Federal penal and correctional system; studies and investigations of the causes, prevalence, and means for the prevention and treatment of mental and nervous diseases; and cooperation with other agencies interested in the various phases of work with which the Division is concerned.

STUDIES OF THE NATURE AND TREATMENT OF DRUG ADDICTION

Studies of the nature and treatment of drug addiction were continued during the year at the United States Public Health Service Hospital, Lexington, Ky.

Follow-up studies of the mental and physical deviations of patients during the period subsequent to the withdrawal of the drug of addiction were continued and have served to strengthen previous impressions that addicted patients do not tend to become normal until several months have elapsed following the withdrawal of narcotics. Further observations on this aspect of addiction seem desirable.

The system of recording objective abstinence symptoms seen in chronic opium poisoning which was put into effect during the preceding year made available for comparative study the measureable components of the abstinence syndrome. These measureable objective signs include such factors as changes in body temperature, respiration rate, blood pressure changes, basal metabolic rate, blood sugar determinations, and caloric intake, as well as the severity or intensity of abstinence symptoms, which is less accurately measurable. However, measurements were made of these latter components of the abstinence syndrome through the application of a sliding scale of weights or graded values. So far as is known this is the first time that an attempt has been made to set up a satisfactory system for recording symptoms of the abstinence phenomena. This system furnishes accurate comparable data for further study and reduces to a minimum the personal equation in evaluating the symptoms. This is necessary for correlating the value, or the scientific merits, of any system or form of treatment applicable to the "withdrawal phase" of opium addiction. The data obtained were studied and analyzed and the method was then applied to evaluate several systems of treatment for the so-called "withdrawal stage," including those for which more

or less specificity has been claimed. The results thus far indicate that systems of treatment, or forms of treatment for which specificity is claimed, have no real value in reducing the severity of symptoms. According to the experiences obtained at the Lexington hospital, the best method for treating the withdrawal stage of opium addiction is the application of palliative measures along with rapid withdrawal of the drug.

The program of study in the field of electroencephalography in relation to drug addiction was continued during the year. This involves a study of the electrical potential or action currents within the brain.

An electroencephalographic apparatus was installed and put into operation, and an associate physicist employed in connection with the application and use of this equipment. Electroencephalograms have been recorded on normal nonaddicted individuals, on addicts stabilized on morphine, and on addicts who were stabilized on substitute drugs. These special studies were well under way by the close of the year. They are incomplete, however, and no reports have been published dealing with this aspect of the addiction problem. It is worthy of note, however, that analysis of the records taken thus far indicates that significant changes occur in the electrophysiology of the brain when an individual becomes addicted to narcotic drugs and there is evidence of difference in the bio-electric phenomena with various narcotic drugs used. It is felt that when these studies have been completed significant information upon some phases of narcotic addiction will be available.

During the past year an effort has been made to develop a point rating scale to be used in evaluating certain psychiatric changes occurring in addicts when stabilized on drugs and during and following their withdrawal. The scale thus far developed is now used in the study of addicts. At the present time the number of cases studied by this method is insufficient to permit any definite conclusions. It is evident, however, that an individual who appears physiologically stable when receiving certain morphine doses is not necessarily stable from a psychiatric or emotional point of view. Evidence so far obtained indicates that it requires more than a stabilizing dose to produce emotional tranquillity. It has also been found that certain narcotic drugs are more likely to produce this feeling which the addict desires than are others. The use of this point rating scale affords comparable data for further study.

Studies have also embraced an intensive investigation of the physical, chemical, psychological, and psychiatric changes resulting from single therapeutic doses of morphine, from repeated doses of morphine used when necessary during the course of the routine care of patients when addiction must be stabilized, and also during that period subsequent to the withdrawal of the drug of addiction. A series of psychophysiological studies was made during the administration of morphine intravenously. It was found that certain physiological alterations occurred before the subject was aware that he was receiving morphine. A number of metabolic determinations were made on stabilized addicts especially as relates to protein, carbohydrate, fat, and water metabolism. The results of these studies will be used chiefly as a guide to the detailed planning of a more

prolonged study of these variables as they relate to the subject of drug addiction, its nature and treatment.

A very valuable contribution to the field was made in the development of a test for morphine in biological materials, which is applicable to excretion studies in human beings. Work was continued on the problem of blood concentration and definite evidence has been obtained showing that strong dependence is associated with a blood hydration, that the abstinence syndrome is accompanied by relative blood dehydration from which the patient recovers by the 8th to the 10th day, and that normal concentration is not regained for many months.

The more specific investigations in the psychological field embrace studies of the effect of morphine on the reaction to certain standardized situations, and its effect on certain physiological reactions or responses to psychological stimuli. These latter observations may be of value as an objective measure for determining, in a more accurate way, that vexing problem of the relationship of chronic opium poisoning to so-called emotional degradation. The evidence obtained by the tests used suggests that there is degeneration of addicts both of short and long duration, but those addicted for long periods of years do not show a greater degree of degeneration than those addicted for shorter periods. The correlation and coordination of these studies is thought to be important and necessary for formulating a more rational form of treatment, since treatment in terms of specificity must rest upon a more intimate knowledge of the nature of drug addiction.

Certain aspects or phases of these investigations will be the subject of special reports from time to time which will be made available to the medical profession and the general public when deemed desirable. Some features of these investigations have not heretofore been undertaken and it is believed the results will add materially to the sum total of knowledge of drug addiction.

The psychiatric aspects of the problem of drug addiction have also been given consideration, and studies in this connection have been carried on. The results of these studies during the past 2 years were set forth in a paper presented at the annual meeting of the American Psychopathological Association in May 1938.

A study of suicidal tendencies among patients admitted to the hospital was also completed and a report bearing upon this phase will be published shortly.

In correlation with the studies of the nature and treatment of drug addiction, investigations were continued regarding habit-forming properties of certain derivatives of opium proposed for use as possible substitutes for morphine. These substances were furnished for the purpose through a cooperative arrangement between the Public Health Service and the Committee on Drug Addiction of the National Research Council.

Studies were completed on the addiction liability of several new compounds. The methods previously used for carrying out and evaluating these substitutions were subjected to further improvement during the year, with the result that the addiction potentialities of new compounds can be compared more accurately with that of morphine.

A thorough re-examination of the addiction liability of codeine was undertaken during the year and will be made the subject of a special report, embracing a complete review of the literature and a study of the use of codeine for the relief of cough in tuberculous patients.

Arrangements are being made to study certain synthetic compounds, which, because of their pharmacological effect, do not lend themselves to the same methods of substitution previously employed.

It seemed desirable to make further studies of methyl dihydromorphinone, a derivative of opium which gave promise of possessing pain-relieving properties equal to those of morphine with dependence supporting action of much shorter duration than morphine. Consequently, in addition to further studies of this substance at Lexington, arrangements were made to have it tested in one of the Marine Hospitals of the Public Health Service and in one of the general hospitals of the United States Army, as well as in certain hospitals under the jurisdiction of the State Health Department of Massachusetts. These studies are still in progress.

Newer substances derived from opium through the studies conducted by Dr. Lyndon F. Small, consultant in alkaloid chemistry to the Public Health Service, in his efforts to obtain a substitute for morphine having the same pain-relieving qualities without the addicting properties of morphine, are patented if they appear to possess promising qualities of such a nature. In this connection letters patent covering "Ethers of Morphine and Dihydromorphine and their Respective N-oxides" was granted by the Commissioner of Patents to Dr. Small on January 4, 1938. This patent was assigned to the United States Government, represented by the Secretary of the Treasury. An application for a patent on "Nuclear Substituted Derivatives of the Morphine Series and Methods for their Preparation" was made jointly by Dr. Small and Mr. Howard Montgomery Fitch. Included in this patent is the process for the preparation of the new substance methyl dihydromorphinone. Patents covering this substance have also been applied for in several foreign countries. To date only the French patent has been granted.

Consideration has been given to the matter of devising the most effective method of insuring to the public the full benefit that may be derived from valuable drugs when the patent rights therefor are assigned to the Government. Numerous conferences were held with representatives of the Bureau of Narcotics, the Committee on Drug Addiction of the National Research Council, the office of the General Counsel of the Treasury Department, the Department of Justice, and the Research Corporation concerning the possibilities of devising methods for releasing them for manufacture and distribution at the minimum cost to the general public. To achieve this purpose it may require the action of some intermediary body like the Research Corporation. No drug will be released for general use until its value is established, and thus far none has been discovered that is considered the solution of the problem, but progress has been made and it is considered advisable to evolve a social machinery ready for use in case a more valuable drug is obtained.

Clinical studies of the analgesic and other properties of morphine and related substances were continued in connection with the relief of pain among cancer patients, and for the relief of cough in tuberculous patients, in cooperation with the Massachusetts State Depart-

ment of Health and the Committee on Drug Addiction of the National Research Council. It seemed desirable to continue these studies further, but the routine duties of the resident physicians in the hospitals concerned required so much of their time that it was found difficult to make any progress in this work. Arrangements were, therefore, made by the Committee on Drug Addiction to provide a physician who could devote his full time to these studies with the clinical material made available by the State of Massachusetts. Before taking over these duties he was given a course of training under Dr. Himmelsbach at the Lexington hospital and Dr. Eddy at the University of Michigan in Ann Arbor.

Studies dealing with the behavior responses of the chimpanzee to certain habit-forming drugs, conducted in cooperation with the Division of Comparative Psychobiology of Yale University were concluded. The results are very similar to those obtained with human subjects.

DISSEMINATION OF INFORMATION

A number of articles pertaining to the work of the Division were published during the year, including the following: "Psychophysiological Reactions Following Painful Stimuli under Analgesia, Contrasted with Gas Anesthesia and Novocaine Block," "The Nursing Care of Drug Addicts," "The Physical Basis of Brain Potential Recording," "A Critical Review of the Withdrawal Treatments, With Method of Evaluating Abstinence Syndromes," and "Suggestibility in Delinquent and Non-Delinquent Adult White Males."

The following articles were approved for publication: "Effects of Age on Speed-Power Relationship With Reference to Tests of Intelligence," "The Treatment of Drug Addicts at the Lexington Hospital," "Studies of Drug Addiction With Special Reference to Opium Derivatives and Allied Synthetic Substances, and their Physiological Action," "The Determination of Morphine in the Urine of Morphine Addicts," "Some Comments on the Psychopathology of Drug Addiction," "Problems Connected With Placing Addicts on Probation on Condition They Go to a Narcotic Farm," "A Statistical Analysis of the Clinical Records of Hospitalized Drug Addicts," "Suggestibility in Chronic Alcoholics," "Suicide Among Hospitalized Drug Addicts," and "The Abuse of Codeine, A Review of Codeine Addiction and a Study of the Minimum Cough Relieving Dose."

Advisory consultant services were rendered to various agencies with reference to the drug addiction problem.

STUDIES OF THE ABUSIVE USES OF AND THE MEDICINAL AND SCIENTIFIC NEEDS FOR NARCOTIC DRUGS

Studies were continued relative to the abusive uses of and the medicinal and scientific requirements of the United States for narcotic drugs.

Studies of the consumption rates of narcotic drugs for the calendar year 1937 indicated that the estimate originally made on September 1, 1937, was insufficient to meet the requirements for the calendar year 1938. During 1937 there was a marked increase in the consumption of codeine. This is consistent with the trend toward increased consumption of codeine which has been in progress for some time, due to the substitution of codeine for morphine in the legitimate

practice of medicine. There has also been a disturbance in the normal inventories of stocks on hand which has seriously depleted the usual supply of fabricated drugs necessary to meet the demands incident to the normal commercial flow. Recommendations were therefore made to increase the quantity of crude material to be imported into the United States during the calendar year 1938 in order to maintain such stocks on a 10 months' working margin, and also to meet the needs indicated by the trend of increased consumption of codeine. Recommendations were also made to increase the reserve supply of crude opium and to set a minimum limit on this reserve supply which must be maintained at all times. In order to safeguard the public health and civil needs from an acute shortage of these drugs, recommendations were made to store all confiscated contraband opium derivatives, to be withdrawn only for medical and scientific purposes, after being purified, if and when the needs of the country demand.

NARCOTIC FARMS

UNITED STATES PUBLIC HEALTH SERVICE HOSPITAL, LEXINGTON, KENTUCKY

The United States Public Health Service Hospital at Lexington, Ky., designed to accommodate 1,000 patients, operated at approximately full capacity during the year, with an average daily patient population of 949. In addition to the special investigations of the nature and treatment of drug addiction, the facilities of the institution were devoted to the current operation of the institution and the maintenance of the physical plants; the operation of industries, involving agricultural activities and the operation of the garment manufacturing shop, both of which are carried on with the special working capital fund established in accordance with the provisions of section 9 of the act of January 19, 1929; to general care, study, and treatment of patients, and occupational therapy; and to the reception, custody, and disposition of patients.

The working capital fund, under which the industrial activities of the hospitals are operated, had an unobligated balance on July 1, 1937, of \$34,831.02. During the fiscal year, receipts totalled \$69,625.52, and expenditures aggregated \$55,420.31, leaving a balance to the credit of the working capital fund as of June 30, 1938, in the amount of \$49,036.23.

The garment shop, which is operated as one of the industries, manufactured all of the clothing used by patients while under treatment, as well as civilian clothing to be issued to patients upon discharge. It also manufactured employees' uniforms, authorized in law to be furnished as part of their compensation, and completed an order for 2,755 operating gowns for the use of the Marine Hospital Division of the Service.

The agricultural industries, embracing the dairy, intensive truck farming, the raising of hogs, beef, and poultry, proved very successful during the course of the year, both from the standpoint of crops and livestock production. During the year the farm produced and delivered to the institution products having a total value of \$45,723.76, which comprised a large proportion of the vegetables, beef, pork, milk, eggs, and poultry consumed in that period. Field crops having a value of \$9,254.22 were produced and consumed by the dairy, beef, and swine

herds and poultry flocks. The dairy herd, consisting of 174 head of cattle, of all ages, had an average of 58 cows producing milk during the year. The average daily production of milk amounted to 190 gallons.

The value of all dairy products, including the animals slaughtered for meat purposes, totalled \$19,071.08. The meat packing activities embraced the production of 13,977 pounds of poultry, 128,423 pounds of beef and veal, 18,216 pounds of lamb and mutton, and 38,430 pounds of pork. It was found necessary, however, during the course of the year to discontinue the sheepfold because of its uneconomical operation and the small amount of lamb and mutton ordinarily consumed by the patients of the hospital. The principal reason for discontinuing the sheepfold was occasioned by the fact that there was no means or method for marketing the wool or the pelts, which resulted in a material loss in operation.

The truck farm delivered to the kitchen of the institution fresh vegetables valued at \$1,940.86, while vegetables furnished to the cannery, eventually disposed of to the institution, had a value of \$2,094.62. The value of the cannery products, involving various vegetables produced, had a total value of \$5,593.40. The poultry flock produced the bulk of the institution's egg supply, delivering 16,971 dozens.

Occupational therapy, administered through the farm, shops, and various maintenance activities in the institution, has been utilized to the greatest advantage in treatment. Minimum custody has been granted to approximately 46 percent of the patients at some time during their residence, and discipline continued to improve. The significance of custody is more and more being recognized as only an incident in the treatment of patients. During the fiscal year under report no patients attempted to escape. The policy of treating prisoner patients beyond their conditional release dates has been almost abandoned. The abandoning of this policy has increased the number of returned conditional release violators, since the less hopeful cases are not being held to the full expiration of their sentences. It has, however, increased the morale of the patients tremendously, and has contributed markedly to the smooth and efficient operation of the institution.

The following table represents a summary report on admissions and discharges at the institution during the year:

Statistical summary of patient movement at the United States Public Health Service Hospital, Lexington, Ky., for the fiscal year 1938

Population June 30, 1937.....	976
Admitted during fiscal year 1938	
Prisoners:	
Received direct from U. S. district courts.....	287
Received by transfer from Federal prisons.....	220
Parole violators returned.....	10
Conditional release violators returned.....	73
	590
Probationers received direct from U. S. courts.....	135
Voluntary patients.....	225
Total admissions.....	950
	<u>1,926</u>

Discharged during fiscal year 1938

Prisoners, cured :		
On parole, prognosis good.....	23	
On conditional release, prognosis good.....	71	
On conditional release, prognosis guarded.....	335	
On conditional release, prognosis poor.....	64	
On conditional release, prognosis very poor.....	7	
Short term expiration (old law), prognosis guarded.....	1	
Short term expiration (old law), prognosis poor.....	1	
Prisoners, improved :		
Full term expiration, prognosis poor.....	81	
Transferred to Federal penal institutions, prognosis guarded..	12	
Transferred to Federal penal institutions, prognosis poor.....	13	
Order U. S. court, writ of habeas corpus, prognosis guarded....	1	
Death.....	10	
Escape.....	0	619
Probationers :		
Cured, prognosis good.....	37	
Cured, prognosis guarded.....	65	
Cured, prognosis poor.....	11	
Death.....	4	
Escape.....	0	117
Voluntaries, cured :		
Prognosis good.....	17	
Prognosis guarded.....	4	
Voluntaries, maximum benefit :		
Prognosis guarded.....	23	
Prognosis very poor.....	1	
Other voluntaries :		
Against medical advice, prognosis poor.....	171	
Detrimental to station.....	2	
Death.....	1	
Escape.....	0	219
Total discharges.....		955
Population June 30, 1938.....		971
Average daily population for the fiscal year.....		949

In the matter of prisoner patients, a follow-up system has recently been initiated. Since its inauguration definite information has been received to the effect that 347 former patients, representing 15.8 percent of the total number of patients discharged since the opening of the institution, had relapsed to the use of narcotics; and that 72 others had been arrested for drug law violations and other crimes, both State and Federal, but had not relapsed to the use of narcotics. Of the combined total, 316 have been returned to this hospital for further treatment of drug addiction or as parole or conditional release violators. Many of the conditional release and parole violators returned had not relapsed to the use of narcotics, and a number of the prisoner patients receiving new sentences and returned here had not relapsed to the use of narcotics since their discharge from the institution.

There were 225 voluntary patients admitted for treatment. Of these, 171 were discharged against medical advice and 2 as detrimental to the station. The leaving of so many voluntary patients against medical advice is regrettable, but there is no existing authority for detaining them against their will.

U. S. PUBLIC HEALTH SERVICE HOSPITAL, FORT WORTH, TEX.

Construction of the initial group of buildings for the United States Public Health Service Hospital, Fort Worth, Tex., has been completed. A contract for the prolonged treatment building and personnel residences, which, when finished, will complete the institution, will be awarded early in the fiscal year 1939.

Passed Asst. Surg. William F. Ossenfort was assigned to duty as Medical Officer in Charge of the hospital in April 1938, with temporary headquarters in Washington, D. C., to handle, with the aid of a skeleton staff, the preliminary work connected with its furnishing and equipment. At the close of the fiscal year 1938 the headquarters of the Medical Officer in Charge were moved to Fort Worth in order to complete equipping and furnishing the institution. It is anticipated that the hospital will be ready to receive patients in October 1938.

The two hospitals, when finished and in operation, will be comparable in function, but somewhat different in architectural design and arrangement. Structurally, the one at Fort Worth will have less emphasis, placed on the custodial features, or, in other words, the artificial barriers will be less pronounced.

MEDICAL AND PSYCHIATRIC SERVICES IN FEDERAL PENAL AND CORRECTIONAL INSTITUTIONS

The Public Health Service continued to supervise and furnish the medical, psychiatric, and other technical and scientific services for the Federal penal and correctional system at institutions under the jurisdiction of the Bureau of Prisons. An additional medical unit was provided for the new Federal jail at Terminal Island, San Pedro, Calif., making a total of 19 independent medical units which provided complete service for 21 institutions composed of 6 penitentiaries, 4 reformatories (one for females), 5 detention institutions, 5 prison camps, and 1 medical center.

Shortly before the opening of the fiscal year, a plan was perfected whereby the medical service would be more closely integrated with the administration, operation, and maintenance of Federal penal institutions, by the assignment of a medical officer of the Public Health Service to the Bureau of Prisons to serve as Medical Director of that Bureau, on a full-time basis. This plan was continued in operation during the entire fiscal year, the details of administering the prison medical service being accomplished in large part directly from that office.

The rehabilitative medical, psychiatric, sanitary, and research program that has been developed by the Division for the penal medical system, was carried to full completion in its routine aspects, but suffered somewhat in its investigative aspirations, and certain other refinements, due to the fact that a number of capable officers were lost by resignations from the Reserve and Acting Assistant Surgeon grades and by the recall of most of the regular commissioned officers to other activities of the Public Health Service. Provision has since been made for an increase of not to exceed 28 regular commissioned officers, who are to be detailed for duty to Federal penal and correc-

tional institutions. It is expected that this provision will accomplish much in the stabilization of the prison medical service.

The problem of the constitutional psychopathic inferior is believed to be one of the really significant problems of prison medical service. Active steps were continued to study this problem intensively in the Federal penal and correctional system, particularly at Chillicothe, Ohio; El Reno, Okla.; and Springfield, Mo. As the fiscal year closed, specially designed units for the intensive examination, study, and treatment of patients afflicted with aggravated and intractable constitutional psychopathic inferiority were under construction at Chillicothe and El Reno and plans for a larger unit at the Medical Center at Springfield were being perfected.

Considerable progress was made in the studies necessary to the preparation of a psychometric group test for use in Federal penal and correctional institutions.

The venereal diseases were actively attacked, in line with Service policy. Most of the stations had carried over into the current year methods for the treatment of early and early-latent syphilis other than the standard continuous-alternating system. During the fiscal year all stations changed over to this system.

One of the significant duties of the Federal penal medical officer that was stressed more than ever during the fiscal year is instruction in first aid, practical psychology, and allied subjects. This important phase of a custodial officer's training is rapidly coming to be accepted as a regular duty of the medical staff.

The sanitary duties of the medical staff were increased at most institutions at the request of the wardens concerned. Several wardens accepted the invitations of Chief Medical Officers to make joint weekly inspections of various parts of the institutions in their charge. This custom is usually reflected in an elevation of the morale of the entire institution.

Closely akin in principle, at least, was the fact that at most stations a medical officer has been made a member of the safety council, and a definite campaign was made to reduce even further the number of industrial injuries, which has been remarkably low.

Several institutions changed their methods of making "sick call" during the year. Leavenworth reduced the number of visits by 50 percent by changing sick call time from 8:30 a. m. ("on the institution's time") to 11:30 a. m. ("on the inmate's time"). A similar plan is followed at several institutions, and at all institutions every prisoner had an opportunity to visit the medical staff at some time during the day. If his condition merited, he was admitted to the hospital, or an appointment was made for him in the outpatient department of the hospital. At most institutions the outpatient department was in full operation throughout the entire working day, examining, treating, and performing minor operations.

Special studies were made at Leavenworth on the use of spinal anesthesia, which the staff considers the most desirable means of inducing anesthesia in prison practice. At Atlanta special study was made of nontoxic, nonhabit-forming substitutes for cocaine as a local anesthetic in eye and nose operations. At Atlanta, also, a

study was made of means whereby psychiatric and psychologic examinations and treatments might be improved, and the usefulness of this service to the inmate population and, by inference, to society at large, might be expanded.

The furnishing of artificial limbs to prisoners has always been a provoking question. Such limbs are expensive and, with sharply limited funds, the number available has usually been very small. Atlanta many years ago perfected the details of fabricating such limbs, and during the fiscal year a plan was inaugurated whereby this service might be extended to other institutions either by the establishment of similar independent workshops or by having the limbs made at Atlanta and shipped to the institutions concerned for fitting.

As the fiscal year closed several hospital building or remodeling projects were actually under way or were being planned from funds definitely allotted. Intensive planning studies were also being made for hospital, sanitary, and other facilities at six new penal or correctional institutions, including a penitentiary to be located at Terra Haute, Ind., a reformatory for women at Dallas, Tex., four detention institutions to be located at Ashland, Ky., Danbury, Conn., Denver, Colo., and Texarkana, Ark.-Tex., respectively.

The number of original articles published during the year fell off markedly from the previous year, due largely to loss of a number of experienced officers and the absorption of new officers unfamiliar with prison work. Articles published included: "Calculus Associated with Epithelioma of Renal Pelvis, With Report of a Case," "The Constitutional Psychopathic Criminal as a Psychiatric Problem," "Some Interesting and Unusual Prosthetic Cases," "Age of Delinquents in Relationship to Rohrschack Test Scores."

An indication of the scope of the medical services rendered during the fiscal year and of the steady growth in this service during the past 6 years is given in the following table and graph:

Annual numbers and rates, for fiscal years ending June 30

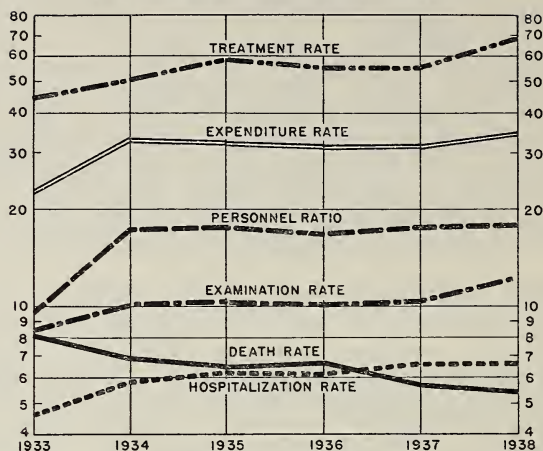
Item	1933	1934	1935	1936	1937	1938
Treatments:						
Number.....	598,318	595,570	786,718	859,771	894,706	1,116,679
Per inmate.....	44.8	50.3	58.4	55.2	55.9	68.7
Expenditures for health services:						
Amount (in dollars).....	297,300	389,961	431,847	484,715	498,299	560,482
Per inmate.....	22.3	33.0	32.0	31.2	31.1	34.5
Personnel (P. H. S.):						
Average number ¹	127.8	206.2	236.7	259.4	281.0	286.0
Per 1,000 inmates.....	9.6	17.4	17.6	16.7	17.5	17.6
Examinations ² :						
Number.....	110,350	118,313	136,278	155,412	164,163	197,718
Per inmate.....	8.3	10.0	10.1	10.0	10.2	12.2
Deaths in institution:						
Number.....	107	82	86	103	92	88
Per 1,000 inmates ³	8.0	6.9	6.4	6.6	5.7	5.4
Hospitalized inmates:						
Average number.....	618.7	690.1	851.4	969.0	1,056.7	1,072.1
Per 100 total inmates.....	4.6	5.8	6.3	6.2	6.6	6.6
Average daily inmate population.....	13,354	11,829	13,481	15,562	16,017	16,255

¹ Covers all Public Health Service personnel, including full-time and part-time medical and dental officers, psychologists, administrative assistants, nurses, and guard attendants.

² Includes medical, dental, psychiatric, and psychological examinations; does not include urological, eye, ear, nose, and throat examinations.

³ Rates based upon average daily inmate population.

UNITED STATES PUBLIC HEALTH SERVICE
WORK IN FEDERAL PENAL AND CORRECTIONAL INSTITUTIONS
BY FISCAL YEARS ENDING JUNE 30, 1933 TO 1938



**STUDIES AND INVESTIGATIONS OF THE CAUSES, PREVALENCE, AND MEANS
 FOR THE PREVENTION AND TREATMENT OF MENTAL DISEASE**

The psychiatric diagnostic service for United States district courts was continued during the year at district courts located in Boston, New York City, Philadelphia, Baltimore, Denver, Detroit, and Kansas City, Missouri; and was extended to the district courts located in Atlanta, Pittsburgh, and Minneapolis. This service makes available to the Federal judges the benefit of a psychiatric opinion to assist them in determining the mental state of a defendant where they consider it an important element in the disposition of the case. Each unit operates with a panel of psychiatrists who examine defendants upon request of the court on a fee basis, fees being paid only for cases actually examined. Hospitalization is provided under a contractual relationship with local hospitals for the temporary care and observation of those persons requiring such service. This work is coordinated through the probation officer of the local Federal court. During the year 107 persons were examined and 14 of those examined were hospitalized for further observation.

The United States Public Health Service continued its cooperation with the Mental Hospital Survey Committee in the study of mental hospital conditions in the several States. The Committee consists of representatives of the United States Public Health Service, the American Medical Association, the Canadian Medical Association, the American Psychiatric Association, the American Neurological Association, the National Committee for Mental Hygiene, and the Canadian National Committee for Mental Hygiene, with Asst. Surg. Gen. W. L. Treadway, Chief of the Division of Mental Hygiene, United States Public Health Service, as chairman. An officer of the Service, Senior Surg. Grover A. Kempf, is associate director of the survey activities.

The objects of the committee are to stimulate the interest of the several States in the adequate care of the mentally ill, to bring about greater equality and wider distribution of facilities therefor, to standardize and make more uniform policies in this connection, and to improve the facilities for undergraduate and postgraduate instruction in the psychiatric field.

During the year 69 mental institutions were surveyed or partially studied in Arizona, Delaware, Georgia, Indiana, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Tennessee, Texas, Virginia, and West Virginia at the request of local authorities, and recommendations were submitted to them.

A statistical analysis was made of data collected during the surveys, including data pertaining to the problem of mental illness, and a report on each survey was submitted to the proper authorities.

Data on the present status of the professional and subprofessional personnel engaged in the public care of the mentally ill have been assembled, and all preparations made for an analysis.

An analysis was made of the laws of the 48 States governing the administration of State mental hospitals and the admission of patients to such hospitals.

Much information has been disseminated through personal interviews and correspondence with those seeking advice on hospital construction and hospital treatment for themselves and others, also with those desiring information for the preparation of special articles on the problems of mental illness. The work of the statistical section has been invaluable in presenting the facts to those interested in the improvement of mental hospitals.

An important work of the Committee was a survey of the mental hospitals of Kentucky that pointed the way to the enactment of new administrative laws for that State, designed to put the mental hospitals of the State on a sound basis. Senior Surg. J. G. Wilson was appointed director of the newly created Division of Mental Hygiene in the Department of Welfare of Kentucky.

As part of the survey of the Health Department of the District of Columbia, a survey was made of its facilities for the care and treatment of the mentally ill, and as a result of the study it was recommended that the mandatory jury trial required in the District for the commitment of a person to a mental hospital be abolished. A new law to provide for insanity proceedings in the District of Columbia embodying this principle was enacted and became effective in June 1938. This law lifted the District of Columbia from the position that it occupied with the one State in the Union that still retains the mandatory jury trial for such commitment.

Field studies in mental hygiene conducted in cooperation with State and local health authorities and the State University in Fayette County, Ky., have continued through the year. These studies of mental disorder in relation to community make-up and function were inaugurated in September 1936.

The primary purpose of this study is to investigate the basic nature and sources of factors involved in the production of mental disorders

which arise in a typical American community. Another objective is to determine whether there is a pattern approach to this problem from the standpoint of the place which mental hygiene might occupy in a regularly constituted health organization. The results of these studies may serve as a guide in the formulation of a public policy aiming to uproot or ameliorate the sources of mental invalidism and make possible more specific recommendations concerning the role that a regularly constituted health agency may justifiably perform in the field of mental hygiene.

The administrative organization consists of two coordinated units designed to obtain research material of an individual and environmental nature from the community.

The first of these two administrative units is organized about a diagnostic and consultative center. Under the immediate supervision of a psychiatrist, this unit obtains material from the community by referral from social agencies, private physicians, teachers, judges, and other individuals. This material, which represents a sample of the community load of mental and social health problems, furnishes a source of research material for intensive study of the individual factors involved in mentally or socially expressed endemic disorders and provides material for a demonstration of the established methods for dealing with mental disorder in the community.

The second administrative unit of the study is concerned with an investigation of the environment or community. Under the immediate supervision of a psychologist-statistician, this unit is making a detailed investigation of Lexington and Fayette County. Material, which consists of official and nonofficial recorded data concerning community make-up and activity, is obtained for this portion of the study in cooperation with the University of Kentucky, official and nonofficial community agencies, local institutions, and individuals.

The data obtained from these investigations requires extensive study, and since they are still in progress, it is not possible to report any definite conclusions.

In connection with studies and investigations relating to mental diseases, the following article was published: "An Approach to a Rural Mental Health Problem." The following articles were prepared and approved for publication during the year: "Regional Differences in the Care of Mental Defect and Epilepsy," and "The Mentally Ill and Mentally Handicapped in Institutions."

DIVISION OF PERSONNEL AND ACCOUNTS

Asst. Surg. Gen. W. F. DRAPER, in charge

The Personnel and Accounts Division supervises all operations of the Service relating to personnel, finances, and the maintenance of property records. The organization of the Division has remained unchanged during the year. Through a personnel section, a finance section, and a property-record section, all matters relating to appointments, separations, and other changes in status of personnel, estimates of appropriations, allotments, and encumbrances, records of expenditures, including administrative audit, and all records of nonexpendable property are administered under the supervision of the Assistant Surgeon General in charge of the Division.

There is still need for additional funds with which to employ more doctors, nurses, and other classes of personnel essential for hospital operation. In order to conserve the limited appropriation available for the maintenance of our hospitals we have been utilizing medical internes in many instances to perform duties to which more experienced doctors should be assigned. Because of the lack of the necessary funds it has not been possible properly to allocate many of the positions at hospitals nor to approve merited promotions. For the same reason it has likewise been impossible to grant the full amount of leave provided for by law to these employees.

PERSONNEL

COMMISSIONED OFFICERS

On July 1, 1937, the regular corps of the Public Health Service consisted of 2 Surgeons General (1 on waiting orders), 8 Assistant Surgeons General, 52 medical directors, 1 sanitary engineer director, 1 pharmacologist director, 54 senior surgeons, 7 senior sanitary engineers, 64 surgeons, 17 dental surgeons, and 8 sanitary engineers, 111 passed assistant surgeons, 23 passed assistant dental surgeons, 9 passed assistant sanitary engineers, and 8 passed assistant pharmacists, 70 assistant surgeons, 9 assistant dental surgeons, and 2 assistant pharmacists—a total of 446 officers. Of this number, 1 Surgeon General, 17 medical directors, 7 senior surgeons, 14 surgeons, 5 passed assistant surgeons, 1 passed assistant dental surgeon, 1 assistant dental surgeon, and 2 assistant pharmacists were on waiting orders. During the fiscal year the following changes occurred in the several grades: 1 Assistant Surgeon General reverted to the grade of medical director, and 1 Assistant Surgeon General reverted to the grade of Senior Surgeon; 1 medical director and 1 senior surgeon were assigned to duty in two of the administrative divisions, Washington, D. C., as Assistant Surgeons General; 8 medical directors, 1 senior surgeon, 1 surgeon, and 2 passed assistant pharmacists were placed on waiting orders status;

3 passed assistant surgeons and 1 assistant surgeon resigned; 1 senior surgeon was promoted to the grade of medical director, 5 surgeons were promoted to the grade of senior surgeons, 2 sanitary engineers were promoted to the grade of senior sanitary engineers, 4 passed assistant surgeons were promoted to the grade of surgeon, 1 passed assistant dental surgeon was promoted to the grade of dental surgeon, 3 passed assistant sanitary engineers were promoted to the grade of sanitary engineers, 39 assistant surgeons were promoted to the grade of passed assistant surgeon, 6 assistant dental surgeons were promoted to the grade of passed assistant dental surgeon; 34 doctors were appointed to the corps in the grade of assistant surgeon, 2 dentists were appointed to the corps in the grade of assistant dental surgeon, 2 doctors were appointed to the corps in the grade of surgeon, and 1 doctor was appointed to the corps in the grade of senior surgeon.

On July 1, 1938, after these changes had occurred, the regular corps consisted of 2 Surgeons General (1 on waiting orders), 8 Assistant Surgeons General, 53 medical directors, 1 sanitary engineer director, 1 pharmacologist director, 59 senior surgeons, 9 senior sanitary engineers, 65 surgeons, 18 dental surgeons, 9 sanitary engineers, 143 passed assistant surgeons, 28 passed assistant dental surgeons, 6 passed assistant sanitary engineers, 8 passed assistant pharmacists, 64 assistant surgeons, 5 assistant dental surgeons, and 2 assistant pharmacists—a total of 481 officers. Of this number, 1 Surgeon General, 25 medical directors, 8 senior surgeons, 15 surgeons, 5 passed assistant surgeons, 1 passed assistant dental surgeon, 2 passed assistant pharmacists, 1 assistant dental surgeon, and 2 assistant pharmacists were on waiting orders.

On July 1, 1938, 3 medical directors, 4 senior surgeons, and 1 surgeon were serving by detail as assistant surgeons general in charge of administrative divisions in Washington, D. C., in accordance with acts approved July 1, 1902, July 9, 1918, and April 9, 1930; 1 medical director was on duty as director of the public health district, New York, N. Y.; 1 surgeon and 3 passed assistant surgeons were serving on detail to the United States Employees' Compensation Commission; 1 senior surgeon was assigned as assistant to the Director, Pan American Sanitary Bureau, Washington, D. C., and 1 surgeon was detailed to the Pan American Sanitary Bureau; 1 medical director, 3 senior surgeons, 1 surgeon, 2 passed assistant surgeons, 1 passed assistant pharmacist, and 1 assistant surgeon were serving on detail to the Bureau of Indian Affairs, Department of the Interior, in connection with the control of communicable diseases among the Indians; 1 medical director, 1 senior surgeon, 2 passed assistant surgeons, 3 passed assistant dental surgeons, and 2 assistant surgeons were serving on detail with the United States Coast Guard; 1 senior surgeon was assigned as medical director to the Farm Security Administration, and 1 surgeon was detailed to the Farm Security Administration; 1 surgeon was assigned to the Social Security Board as consultant in connection with the program of assistance to the blind; in connection with mental-hygiene activities, 1 senior surgeon was assigned as consultant to the Director and staff of the Bureau of Prisons; 1 senior surgeon, 1 surgeon, 1 passed assistant surgeon, and 2 assistant surgeons were assigned for duty at various penal and correctional institutions; 1 senior surgeon, 1 surgeon, 6 passed assistant surgeons, 1 passed assistant

dental surgeon, and 1 assistant surgeon were assigned to duty at the United States Public Health Service Hospital (narcotic farm) at Lexington, Ky.; 2 passed assistant surgeons, 1 passed assistant pharmacist, and 1 assistant dental surgeon were assigned to duty at the United States Public Health Service Hospital (narcotic farm) at Fort Worth, Tex.; 1 senior surgeon, 1 passed assistant surgeon, and 2 assistant surgeons were assigned on special field studies in mental hygiene.

RESERVE OFFICERS

On July 1, 1937, the reserve commissioned officers on active duty numbered 85, consisting of 7 surgeons, 1 dental surgeon, 14 passed assistant surgeons, 1 passed assistant dental surgeon, 52 assistant surgeons, and 9 assistant dental surgeons.

On July 1, 1938, the number of reserve officers on active duty was 91, consisting of 7 surgeons, 1 dental surgeon, 19 passed assistant surgeons, 2 passed assistant dental surgeons, 54 assistant surgeons, and 8 assistant dental surgeons.

ACTING ASSISTANT SURGEONS

On July 1, 1937, there were 732 acting assistant surgeons in the Public Health Service, and by July 1, 1938, this number had decreased to 726.

Of the 726 acting assistant surgeons, 81 were on duty at marine hospitals; 440 were engaged in immigration, relief, and maritime, border, insular, and foreign quarantine work; 6 were engaged for duty in connection with the field investigations of public health; 128 were detailed for duty with the United States Coast Guard and Lighthouse Services; 3 were serving with the Employees' Compensation Commission by detail; 36 were serving at various penal and correctional institutions; and 32 were engaged in antivenereal disease activities as part-time employees at nominal compensations. Twelve of the 32 acting assistant surgeons engaged in antivenereal disease activities held appointments as collaborating epidemiologists.

ATTENDING SPECIALISTS

On July 1, 1937, there were 635 attending specialists in the Service, and during the year this number increased to 717, of which 317 were consultants to marine hospitals, while 52 were available for call at second- and third-class relief stations; 57 were engaged in antivenereal disease activities; 131 were serving at various penal and correctional institutions; and 160 were consultants in connection with quarantine, immigration, and scientific research activities.

INTERNES

On July 1, 1937, there were 172 medical and dental internes in the Service; on July 1, 1938, there were 167. Internes are appointed for temporary periods of 1 or 2 years for duty at marine hospitals, federal penal and correctional institutions, and stations where mental hygiene activities are being conducted.

PHARMACISTS AND ADMINISTRATIVE ASSISTANTS

On July 1, 1937, there were 12 pharmacists and 54 administrative assistants in the Public Health Service. During the year, 1 chief pharmacist died and 4 new appointments were made; 1 administrative assistant was changed to principal clerk, and 7 new appointments were made in the administrative corps, making a total on July 1, 1938 of 15 pharmacists (10 chief pharmacists and 5 pharmacists) and 60 administrative assistants.

NURSES, DIETITIANS, AND RECONSTRUCTION AIDES

On July 1, 1937, there were on duty 662 nurses, 37 dietitians, 47 aides and physiotherapy assistants, 1 hospital service worker, 2 librarians, and 73 guard attendants.

On June 30, 1938, there were on duty 686 nurses, 41 dietitians, 47 aides and physiotherapy assistants, 1 hospital service worker, 2 librarians, 1 druggist, 1 medical technician, and 82 guard attendants. Of this number 60 nurses, 4 dietitians, and 7 aides were on a temporary status.

In the permanent service 69 nurses, 3 dietitians, 3 aides, and 6 guard attendants resigned. Twenty nurses, 3 dietitians, 1 aide, and 2 guard attendants were discontinued. Of this number 5 nurses, 1 dietitian, and 1 aide were retired for physical disability. Five nurses and 2 dietitians became beneficiaries of the United States Employees' Compensation Commission. There was one death. In the temporary group 21 nurses resigned, 74 nurses, 7 dietitians, and 1 aide were discontinued.

In January 1938, 217 additional attendants were authorized for auxiliary duty with the Nursing Service in the Hospital Division. Although this auxiliary service has materially increased the efficiency of the Nursing Service, it is still impossible to reduce the number of working hours to 44 per nurse per week. Night nurses still serve from 69 to 80.5 hours weekly.

CONTRACT DENTAL SURGEONS

On July 1, 1937, there were 55 contract dental surgeons employed at the marine hospitals, second-, third-, and fourth-class relief stations, and the various penal and correctional institutions. These part-time employees are appointed for local duty and receive fixed and uniform fees for dental work performed by Service beneficiaries. On July 1, 1938, this number had decreased to 54; 6 were at marine hospitals, 33 were at second- and third-class relief stations, 7 were serving at various penal and correctional institutions, and 8 were detailed to the United States Coast Guard for duty.

ASSISTANT COLLABORATING EPIDEMIOLOGISTS

During the year the number of assistant collaborating epidemiologists was increased from 4,565 to 5,817. These employees are health officers or employees of State or local boards of health, who receive only nominal compensation from the Federal Government and who furnish the Service with reports of communicable diseases received

by State or local health organizations. The number of collaborating epidemiologists on duty on July 1, 1938, was 34. These appointees are officials of the State boards or departments of health and are on duty in the different States.

NATIONAL INSTITUTE OF HEALTH

The scientific staff of the National Institute of Health comprises 241 members, of whom 81 were commissioned medical officers and 160 other research workers. The staff was assisted by 83 technicians and 348 other subordinates, making a total of 672.

PROPERTY RECORDS

The property return section has accounted for all property of the Service and 337 property returns have been audited during the year. A total of \$17,578.34 was turned in to "Miscellaneous Receipts" from sales of property. Property surplus to the Public Health Service valued at \$15,749.24 was transferred to other Government departments. Surplus property of other Government departments valued at \$48,491.70 was taken over by the Public Health Service. Property valued at \$71,797.66 has been transferred from Service stations where it was surplus to other stations where it could be used. By exchange allowance on old typewriters turned in \$1,081.50 was saved. This exchange allowance on old cars is not available to this office with the present records.

ACCOUNTS SECTION

The Accounts Section of the Division of Personnel and Accounts conducts all bookkeeping and accounting in connection with the expenditure of Public Health Service appropriations. This includes also accounts of miscellaneous collections, allotments, records of excumbrances, cost accounting, and the administrative audit. A statement of appropriations, expenditures, and balances, with miscellaneous receipts, is published as an appendix to this report.

PERSONNEL STATEMENT

The accompanying tabular statement shows the personnel of the Service as of July 1, 1938. Of the 13,895 employees shown in the table, 5,851 listed as collaborating epidemiologists and assistant collaborating epidemiologists receive only nominal compensation. They are mainly officers or employees of State and local health organizations who collaborate in the collection of morbidity statistics by furnishing the figures collected by those organizations relating to cases of communicable diseases. The personnel statement also includes all part-time employees, those employed on a per-diem basis, and those whose compensation is on a fee basis.

Consolidated quarterly personnel report for quarter ending July 1, 1938

[Prepared from records in the Division of Personnel and Accounts]

U. S. Public Health Service	Regular corps						Reserve corps				Noncommissioned personnel								
	Surgeon General	Assistant Surgeon General	Medical director	Senior surgeon	Surgeon	Passed assistant surgeon	Assistant surgeon	Medical director	Senior surgeon	Surgeon	Passed assistant surgeon	Assistant surgeon	Acting assistant surgeon	Attending specialists and consultants	Contract dental surgeons	Interns	Pharmacist	Administrative assistant	Assistant collaborating epi- demiologists and collab- orating epidemiologist
Administrative and departmental.	1	8	1	2	2	2													
FIELD																			
Hospital division.																			
Marine hospitals:																			
Baltimore, Md.																			
Boston, Mass.			1	1	4	4	3			1	1	3	5	26		18		1	
Buffalo, N. Y.													2	23	1	5		1	
Carville, La.			1	1	1	1	1						3	7		4	1		
Chicago, Ill.			1										4	4			1		
Cleveland, Ohio.													5	21		8		2	
Detroit, Mich.			1	1	3	2	1						6	9		1		2	
Ellis Island, N. Y.			1										4	15		4	1		
Evansville, Ind.			1	2	1	2	1						6	8		2		1	
Fort Stanton, N. Mex.													4	11					
Galveston, Tex.													1	3					
Hudson Street, N. Y.			2	1	1	2	1						10	14	1	10	1	1	
Key West, Fla.			1	1	1	2	1			1	1	1	1	16		2	2	1	
Louisville, Ky.													2	11	2	2	1		
Memphis, Tenn.													2	13	1	3			
Mobile, Ala.													3	6					
New Orleans, La.			1	1	1	1	1						2	12		17	2	1	
Norfolk, Va.			2	2	2	4	4						4	11		11	1	2	
Pittsburgh, Pa.			1										2	12		2	1	2	
Portland, Maine.				1									2	12		2	1	1	
St. Louis, Mo.													1	12		1	1	1	
San Francisco, Calif.													2	15		14	1		
Savannah, Ga.			1		1	1	1						3	24		2	1		
					1	2	2						5	8		4			

Seattle, Wash.	1	2	2	6	5					1	3	1	23	9	1	2
Staten Island, N. Y.		1	2	11	1						2	8	11	22		3
Vineyard Haven, Mass.		1								1		1	1			
Relief stations:																
Second class.	2	1		3	3											
Third class.																
Coast Guard and Lighthouse Service.																
Departmental emergency relief.	1	1		5	2					1	7	13	34	7	1	2
Perry Point supply station.												150	13	26		
All other activities.	1	1	1	1								128	4	8		
Foreign Quarantine Division.										5						
Quarantine stations:																
Baltimore, Md.			1									3	1			3
Boston, Mass.	1				1							1	1			1
Ellis Island (also immigration).	1	1										16				
Fort Monroe, Va.	1											1	1			
Galveston, Tex.			1									2	2			
Laredo, Tex.		1										4	4			
Marcus Hook, Pa.												3				1
New Orleans, La.			1		1							3	3			1
Rosebank, N. Y.		1		1								6				2
San Francisco (also immigration).	1											35	2			1
Foreign ports.	2	2	1	11	1							199	1		2	7
All other stations.		2	5	6	5											
Domestic Quarantine Division.																
Interstate sanitary activities.		3	4	1												1
Rural health cooperation.		2	7	1												1
All other activities.		2	2	6	2											
Scientific Research Division.																
National Institute of Health (administrative).			1	2									28			2
Division of Chemistry.	1		1		1							1	3			3
Division of Pharmacology.													2			
Division of Zoology.				1	1											
Division of Infectious Diseases.	5	7	6	8	6							16				1
Division of Public Health Methods.		5	2	10								52		1		1
Division of Industrial Hygiene.	1	1	2	6						1	2	2	14			
National Cancer Institute.		1	1	1	1							25				
Cooperative projects.												5	5			
All other activities.		1	1	4	1							1	5			
Division of Sanitary Reports and Statistics.																
Division of Venereal Diseases.	1	1	2	17	4					1		32	57			5,851
Division of Mental Hygiene.																
Alcatraz Island, Calif.																
Alderson, W. Va.										1			1			
Atlanta, Ga.												4	3			
Chillicothe, Ohio.										1	2	1	4			1
El Reno, Okla.												2	1	5		1
Fort Leavenworth, Kans.										1	2	2	4			1
La Tuna, Tex.													2			
Leavenworth, Kans.		1	6									3	6	1		1
Lexington, Ky.												1	4			2
Lewisburg, Pa.		1	1	7	1							2	4			3
McNeil Island, Steilacoom, Wash.											3	1	11			1
										1		2	4			2

Consolidated quarterly personnel report for quarter ending July 1, 1938—Continued

U. S. Public Health Service	Regular corps							Reserve corps				Noncommissioned personnel							
	Surgeon General	Assistant Surgeon General	Medical director	Senior surgeon	Surgeon	Passed assistant surgeon	Assistant surgeon	Medical director	Senior surgeon	Surgeon	Passed assistant surgeon	Assistant surgeon	Acting assistant surgeon	Attending specialists and consultants	Contract dental surgeons	Interns	Pharmacist	Administrative assistant	Assistant collaborating epidemiologist
FIELD—continued																			
Division of Mental Hygiene—Continued.																			
Milan, Mich.													2						
New Orleans, La.													2						
Petersburg, Va.													2						
Springfield, Mo.					1		1					4	2						
Tucson, Ariz.													1						
All other activities				2			3						8		3			2	
Miscellaneous														64					
Detailed to other offices			2	4	5	7	1												
On waiting orders (commanding officers)	1		25	8	15	8	3												
All others			1	1															
Grand totals	2	8	55	68	92	185	71			8	21	62	736	717	54	167	15	60	5,851

U. S. Public Health Service	Noncommissioned personnel—Continued												Totals				
	Druggist	Aide (P. T. and O. T.)	Dietitian	Nurse	Scientific personnel and hospital laboratorians	Pilot	Marine engineer	Sanitary fumigator and	Clerk	Departmental personnel (regular)	Temporary emergency workers	Attendant	All other field employees	Commissioned officers (regular and reserve)	Noncommissioned em- ployees	Subtotal (or station total)	Grand total (or division total)
Administrative and departmental.....										240	45			16	285	301	301
Hospital division.....																	
Marine hospitals:																	
Baltimore, Md.....	1	4	3	41	3				14		15	113	17	16	261	277	
Boston, Mass.....	1	1	1	19	2				9		20	50	17	8	151	159	
Buffalo, N. Y.....		1		6	2				3		16	15	3	2	62	64	
Cerule, La.....	1			14	1				6				107	1	306	307	
Chicago, Ill.....		2	2	22	2				9		20	67	19	7	176	183	
Cleveland, Ohio.....	1	1	1	23	3				4		19	83	9	10	167	177	
Detroit, Mich.....	1	2	1	30	1				7		12	77	18	9	176	185	
Ellis Island, N. Y.....	1	1	4	2	4				5		12	12	12	10	240	250	
Fort Stanton, N. Mex.....	1	1	2	8	2				4		3	33	1	3	64	67	
Galveston, Tex.....			1	11	2				11		1	82	34	6	145	151	
Hudson Street, N. Y.....		6	1	19	5				5		6	48	17	5	136	131	
Key West, Fla.....				5	5				10		23	10	24	7	112	119	
Louisville, Ky.....				10	3				3		3	19	1	3	57	40	
Memphis, Tenn.....	1			16					3		8	29	7	5	78	83	
Mobile, Ala.....	1			1	1				5		11	44	5	7	99	104	
New Orleans, La.....	1	2	3	53	5				4		12	50	10	7	105	112	
Norfolk, Va.....		1	2	27	4				20		14	133	29	17	295	312	
Pittsburgh, Pa.....	1			7	1				6		11	19	19	10	191	201	
Portland, Maine.....				12					3		7	17	2	3	55	59	
St. Louis, Mo.....				7					3		3	15	13	4	55	59	
San Francisco, Calif.....		3		41	1				5		5	132	31	6	274	294	
Savannah, Ga.....		1	1	17	1				13		2	34	5	7	82	89	
Seattle, Wash.....	1	1	1	38	2				4		10	95	30	20	223	243	
Staten Island, N. Y.....	2	4	5	68	4				14		53	185	50	18	499	447	
Vineyard Haven, Mass.....				2					2				2	1	16	17	
Relief stations:																	
Second class.....		1	1	6	3				12		14	12	2	17	107	124	
Third class.....					1				8			1			199	199	
																	4, 738

Consolidated quarterly personnel report for quarter ending July 1, 1938—Continued

U. S. Public Health Service	Noncommissioned personnel—Continued													Totals			
	Druggist	Aide (P. T. and O. T.)	Dietitian	Nurse	Scientific personnel and hospital laboratorians	Pilot	Marine engineer	Sanitary fumigator and	Clerk	Departmental personnel (regular)	Temporary emergency workers	Attendant	All other field employees	Commissioned officers (regular and reserve)	Noncommissioned em- ployees	Subtotal (or station total)	Grand total (or division total)
FIELD—continued																	
Hospital division—Continued																	
Coast Guard and Lighthouse Service.....				2					1					10	142	152	
Departmental emergency relief.....				17					4		3			1	21	21	
Perry Point—supply station.....									2					6	10	11	
All other activities.....														2	11	22	
Foreign Quarantine Division.....																	
Quarantine stations:																	901
Baltimore, Md.....						1	2		1			8	5	1	23	24	
Boston, Mass.....						3	2	1	3			7	2	2	18	20	
Ellis Island (also immigration).....								5	3			1	1	2	25	27	
Fort Monroe, Va.....						2		1				4	3	1	12	13	
Galveston, Tex.....						2	2		2				4	1	14	15	
Laredo, Tex.....								2				2	1	1	15	16	
Marcus Hook, Pa.....				2		2	2	2	1			11	2	1	26	26	
New Orleans, La.....						4	3	9	6			17	1	2	28	30	
Rosebank, N. Y.....						6	5	23	2			5	27	2	92	94	
San Francisco (also immigration).....				1		3	2	7	2			5	16	3	39	42	
Foreign ports.....								20	3				2	17	62	79	
All other stations.....				2	2	18	12	58	16			57	123	18	497	515	298
Domestic Quarantine Division.....																	
Interstate sanitary activities.....									5					8	79	87	
Rural health cooperation.....									6					9	16	26	
All other activities.....					3				2		141		27	12	173	185	
Scientific Research Division.....																	
National Institute of Health (administrative).....																	884
Division of Chemistry.....	1		1	16	3				15			1	67	3	39	42	
Division of Pharmacology.....				24	24				2				14	3	63	66	
Division of Zoology.....				7	7				6				6	1	17	18	
Division of Infectious Diseases.....				4	33				24				97	32	176	208	
Division of Public Health Methods.....	1				31				67				22	17	177	194	

U. S. Public Health Service

[illegible]

CHIEF CLERK'S OFFICE

DANIEL MASTERSON, Chief Clerk and Administrative Officer

Activities under the supervision of the Chief Clerk and Administrative Officer increased during the year in every part of his division as a result of the extended programs of the Public Health Service. This expansion of work was reflected particularly in the offices of personnel administration, printing and binding, office supplies and equipment, in library activities, and in the large amount of mail and telegrams received and dispatched.

DEPARTMENTAL PERSONNEL

On July 1, 1937, there were 228 departmental employees on duty in the District of Columbia. Of this number 166 were paid from the appropriation Salaries, Office of the Surgeon General, 36 from the appropriation Diseases and Sanitation Investigations, 16 from Expenses, Division of Mental Hygiene, and 10 from Expenses, Division of Venereal Diseases.

During the year 13 employees were added to the force, 11 of whom were paid from the appropriation Diseases and Sanitation Investigations, 1 from the appropriation Maintenance, National Cancer Institute, and 1 by allotment from the Department of Justice, bringing the total number of departmental personnel on duty June 30, 1938, to 241.

There were also on duty 57 emergency employees who were employed outside the scope of the Civil Service but in accordance with the provisions of Executive Order No. 6746 of June 21, 1934, and whose salaries were paid from emergency relief funds. Thirty-four of these employees were on duty in the Division of Personnel and Accounts, 1 in the Office of the Surgeon General, 8 in the Hospital Division, 11 in the Chief Clerk's Office, 2 in the Division of Domestic Quarantine, and 1 in the Office of Public Health Education under the Division of Sanitary Reports and Statistics.

During the fiscal year 7 employees resigned, 1 died, 3 retired, and 7 were transferred either to Public Health Service field stations or other Government agencies. Increases in salary were made possible to 23 employees by reason of their advancement to positions which became vacant by resignations, death, transfers, or retirement of the incumbents. Reallocations of positions were made by the Civil Service Commission to the number of 23, of which 19 resulted in salary increases.

The average salary on July 1, 1937, was \$1,902.39, and on June 30, 1938, it was \$1,896.03. This reduction in average salary was occasioned in part by the fact that no general administrative promotions were made during the period covered by this report, while in almost all instances vacancies were filled at the minimum salary rate of the grade.

Sick leave for the year averaged 6.88 days per employee as compared with 6.87 days for the preceding year.

Mr. Elmo D. Cantrell, a messenger on duty in the Office of the Chief Clerk and Administrative Officer, died May 17, 1938. Mrs. Straudie A. Hughes, assistant clerk stenographer, and Miss Nana S. Caldwell, assistant clerk in the Hospital Division, retired because of physical disability on March 31, 1938, and June 30, 1938, respectively, and Mr. Harvey T. Blatchley, under operator, office devices, Office of the Chief Clerk and Administrative Officer, retired because of age on August 31, 1937.

PRINTING AND BINDING

The sum of \$65,300 was allotted from the Treasury Department's appropriation for printing and binding for the fiscal year 1938. In February, \$7,905 of this amount was withdrawn by the Department because of an emergency existing in one of its other bureaus. The sum withdrawn, with an additional \$895, was restored in June through the passage of the Second Deficiency Bill, making a total departmental allotment of \$66,195. This amount was further augmented by allocations from Public Health Service appropriations available for printing and binding, making a grand total of \$86,466.44, the approximate amount of expenditures for the year. The money allocated by Public Health Service appropriations was for specified jobs, however, and could not be used for general printing. As a result, therefore, of the inadequacy of the regular appropriation, 39 printing requisitions submitted in June, covering chiefly blank forms to replenish stock, were returned by the Division of Printing.

The expansion of the activities of the Public Health Service by congressional legislation has correspondingly enlarged the printing needs, requisitions for the year representing an increase of about 20 percent over the preceding year. A still greater increase is anticipated for the next fiscal year as the new programs, which depend in a large measure on printed material for their success, are put into effect.

OFFICE QUARTERS, SUPPLIES, AND EQUIPMENT

The matter of providing adequate office space for the increase in personnel during the year created a problem. The situation was met to some extent, however, by the removal of partitions, the division of certain existing office spaces into two offices, the use of approximately one-third of the space set aside for exhibits, and the allocation of certain space in the corridors for desks and file cases.

The work of the photostat unit, duplicating unit, and the carpenter shop increased proportionately with the additional functions of the Service. A total of 3,959 requisitions for stationery supplies for field and departmental activities and for miscellaneous equipment and supplies was approved during the year. Sums expended for equipment and supplies were \$7,000 from the Contingent appropriation and \$19,493 from the Diseases and Sanitation Investigations appropriation. The sum of \$31,692 was expended from the Stationery

appropriation of the Treasury Department for stationery supplies for field and departmental activities.

At the close of the fiscal year 1937, arrangements were made for the installation of a tile drainage system in the lawn area in front of the Administration Building, in order to improve the condition of the grass and shrubbery, a centralized water-cooling system for drinking water in the building, and an expansion valve in connection with the hot-water-supply system for the purpose of insuring an adequate supply of hot water during the summer as well as in the winter. Work on these improvements to building and grounds was started during the fiscal year 1938.

PUBLIC HEALTH SERVICE LIBRARY

The library at Administrative Headquarters now contains about 15,326 bound volumes, and also a collection of pamphlets numbering approximately 8,125. During the year 695 bound volumes were added, 64 of which were purchased. The remainder of the accession consists of books received as gifts, bound volumes and periodicals, and Federal and State documents. The additional number of pamphlets received is estimated as 250.

Two hundred and sixty serial publications were received and routed to the persons interested in the particular fields. Of this number 34 were paid subscriptions to medical and health periodicals, while the others were received gratuitously and by exchange. Approximately 145 bulletins from State, city, and foreign welfare and health departments were received. During the year 7,078 books were circulated, including 233 sent into the field. Of the total circulated, 5,685 were Public Health Service books and 1,393 were borrowed from outside libraries.

Readers visiting the library numbered 5,357, an increase of 25.2 percent over the preceding year. There was also an increase of 64.4 percent in telephone requests, the number totaling 1,249 for the year.

MAIL AND RECORDS

This section reflected the general increase in the activities of the Public Health Service in the volume of correspondence received and dispatched during the year. The following table shows the number of pieces of incoming and outgoing mail and also the quantity of correspondence classified, recorded, and filed:

Incoming mail pieces.....	749,358	
Incoming telegrams.....	8,665	
Total incoming correspondence.....		758,023
Outgoing mail pieces.....	331,725	
Outgoing telegrams.....	6,252	
Total outgoing correspondence.....		337,977
Grand total.....		1,096,000
Mail classified.....	182,532	
Mail recorded.....	121,641	
Correspondence filed.....	216,822	

EMPLOYEE ACTIVITIES

Employee activities at Administrative Headquarters include a Federal Credit Union, a Relief Association, and a Recreation Association. The Credit Union, which is under the supervision of the Farm Credit Administration, has continued to grow in service and savings. The report for the year ending December 1937 showed assets amounting to \$9,869.26. By the end of the fiscal year 1938 assets had grown to \$13,277.40. Business transactions of this organization progressed so successfully that a dividend of 6 percent was declared at the annual meeting in January.

The Relief Association was organized to lend assistance through loans and gifts to employees in acute need of financial aid. This association is ably supported by the employees, membership having increased from 105 members in 1937 to 324 members at the close of the fiscal year 1938.

The Recreation Association was organized on September 15, 1937, for the promotion of sports and social life among the Public Health Service personnel. At the end of the fiscal year the membership had grown to 187 persons. This association sponsors various kinds of sports teams and cultural clubs, and presents attractive forms of entertainment on special occasions through its Dramatic Club and Glee Club.

APPENDIX

FINANCIAL STATEMENT

The following is a statement of expenditures from appropriations of the Public Health Service for the fiscal year 1938:

Appropriation	Appropriated	Received by transfer	Budget reserve	Available for obligation	Expenditures		Unobligated balance
					Direct obligations	Transfer to other appropriations	
Salaries, Office of Surgeon General.....	\$316,000	¹ 7,153	-----	\$323,153	\$322,915	-----	\$238
Pay, etc., commissioned officers.....	1,820,000	² 222,414	-----	2,042,414	2,041,832	-----	582
Pay of acting assistant surgeons.....	340,200	-----	\$34,000	306,200	305,310	-----	890
Pay of other employees.....	1,000,000	-----	20,000	980,000	976,855	-----	3,145
Freight, transportation, etc.....	25,450	-----	2,500	22,950	22,490	-----	460
Maintenance, National Institute of Health.....	64,000	-----	-----	64,000	63,490	-----	510
Pay of personnel and maintenance of hospitals.....	6,150,000	³ 1,051,500	87,453	7,114,047	7,078,077	-----	35,970
Quarantine service.....	331,250	-----	20,900	310,350	300,268	-----	10,082
Preventing the spread of epidemic diseases.....	280,000	-----	34,900	245,100	238,904	-----	6,196
Interstate quarantine service.....	36,500	-----	3,600	32,900	32,782	-----	118
Control of biologic products.....	55,000	-----	-----	55,000	54,533	-----	467
Expenses:							
Division of Venereal Diseases.....	80,000	-----	8,000	72,000	71,913	-----	87
Division of Mental Hygiene.....	647,580	-----	1,725	645,855	642,421	-----	3,434
Educational exhibits.....	1,000	-----	200	800	744	-----	56
Diseases and sanitation investigations.....	1,600,000	⁴ 22,911	116,060	1,506,851	1,295,021	⁵ \$203,302	8,528
Maintenance, National Cancer Institute.....	400,000	-----	-----	400,000	399,857	-----	143
Working-capital fund, narcotic farm, Lexington, Ky.....	-----	⁶ 103,883	-----	103,883	56,441	-----	47,442
Appreciation of foreign currencies.....	-----	⁷ 28,000	-----	28,000	27,700	-----	300
Expenses, Division of Mental Hygiene, 1938-39.....	-----	⁸ 170,000	-----	170,000	11,878	-----	158,122
Total.....	13,146,980	1,605,861	329,338	14,423,503	13,943,431	203,302	276,770
Grants to States for public health work, Social Security Act.....	8,000,000	⁹ 1,116,656	-----	9,116,656	8,908,715	-----	207,941

¹ \$7,153 reimbursement from diseases and sanitation investigations, Public Health Service, 1938.
² \$7,333 medical and hospital service, penal institutions (Justice transferred to Treasury, Public Health Service) 1938; \$18,932 Employees' Compensation Commission; and \$196,149 diseases and sanitation investigations, Public Health Service, 1938.
³ \$736,722 Veterans' Administration; \$265,806 hospital care of members of Civilian Conservation Corps; Employees Compensation Commission \$21,429; Department of Justice \$1,645; Allied Soldiers \$2,360; Railroad Retirement Board \$1,070; Army and Navy and Coast Guard \$14,604; Saving Bonds \$1,800; Loans and Currency \$473; Accounts and Deposits \$608; Securities and Exchange \$1,800; supplies and services (various divisions) \$3,153.
⁴ \$4,220 Social Security Board; \$18,691 Interstate Commerce Commission.
⁵ \$196,149 to pay, etc., commissioned officers, 1938; \$7,153 to salaries, Office of Surgeon General.
⁶ Balance July 1, 1937, \$34,293; earnings \$69,590.
⁷ \$28,000 Public Health Service allotment from Secretary of the Treasury.
⁸ \$170,000 from Procurement Division, Treasury.
⁹ \$1,116,656 transferred from 1937.

FUNDS MADE AVAILABLE FROM OTHER SOURCES

Funds made available to the Public Health Service from other appropriations and other sources and expenditures therefrom during the fiscal year 1938 were as follows:

Appropriation	Available	Expenditures		Balance
		Direct	Transfer to other appropriations	
Medical and hospital service, penal institutions (Department of Justice).....	\$479,092	\$469,918	\$7,333	\$1,841
Mosquito control (District of Columbia).....	4,100	3,792	-----	308
Greater Texas and Pan American Exposition.....	3,000	1,876	-----	1,124
Emergency Relief, Treasury, Public Health Service, 1938 (Act 1937) health survey.....	316,713	315,275	-----	1,438
Emergency Relief, Treasury, Public Health Service, 1938 (Act 1935) Hot Springs, Ark.....	163,266	156,023	-----	7,243
Total.....	966,171	946,884	7,333	11,954

¹ \$1,095 of this amount returned to master account Jan. 13, 1938.

Miscellaneous receipts

Source	Amount
General fund receipts:	
Quarantine charges.....	\$211,713.93
Hospital charges and expenses.....	57,989.65
Sale of subsistence.....	15,269.31
Sale of occupational therapy products.....	579.59
Sale of obsolete, condemned, and unserviceable equipment.....	17,590.01
Rents.....	5,698.80
Reimbursement for Government property lost or damaged.....	623.77
Commissions on telephone pay stations installed in Service buildings.....	2,155.99
Sale of refuse, garbage, and other byproducts.....	3,297.01
Sale of livestock and livestock products.....	1,138.40
Other revenues.....	2,273.05
Total.....	318,335.51
Trust fund receipts:	
Sale of effects of deceased patients.....	2,402.55
Inmates' fund.....	34,435.14
Grand total.....	355,173.20

QUARANTINE SERVICE—EXPENDITURES BY STATIONS

Name of station	Pay of officers and employees	Maintenance	Total
CONTINENTAL QUARANTINE STATIONS			
Baltimore, Md.....	\$39,140.66	\$22,998.72	\$62,139.38
Biscayne Bay (Miami), Fla.....	40,500.33	27,265.79	67,766.12
Boca Grande, Fla.....	1,275.00	65.00	1,340.00
Boston (Gallops Island), Mass.....	46,200.61	10,643.37	56,843.98
Brownsville, Tex.....	21,685.58	3,030.39	24,715.97
Brunswick Ga.....	1,845.00	80.85	1,925.85
Calexico, Calif.....	1,440.00	-----	1,440.00
Cape Fear (Southport), N. C.....	6,493.25	527.51	7,020.76
Charleston, S. C.....	21,017.74	6,635.24	27,652.98
Columbia River (Astoria), Oreg.....	5,433.33	704.16	6,137.49
Columbus, N. Mex.....	1,701.62	-----	1,701.62
Corpus Christi, Tex.....	1,980.00	49.20	2,029.20
Cumberland Sound (Fernandina), Fla.....	300.00	-----	300.00
Del Rio, Tex.....	5,885.00	739.20	6,624.20
Eagle Pass, Tex.....	8,446.66	340.44	8,787.10

QUARANTINE SERVICE—EXPENDITURES BY STATIONS—Continued

Name of station	Pay of officers and employees	Maintenance	Total
CONTINENTAL QUARANTINE STATIONS—continued			
El Paso, Tex.....	\$28,823.27	\$2,689.49	\$31,512.76
Eureka, Calif.....	1,560.00	8.00	1,568.00
Freeport, Tex.....	325.00		325.00
Galveston, Tex.....	25,663.20	7,931.26	33,594.46
Gloucester, Mass.....	1,800.00		1,800.00
Gulfport, Miss.....	7,658.00	1,425.54	9,083.54
Hidalgo, Tex.....	7,630.46	476.15	8,106.61
Key West, Fla.....	3,600.00	131.05	3,731.05
Laredo, Tex.....	26,638.92	2,189.31	28,828.23
Marcus Hook, Pa.....	50,483.28	14,568.09	65,051.37
Mercedes, Tex.....	2,415.00	646.62	3,061.62
Mobile, Ala.....	24,935.50	7,790.54	32,726.04
Naco, Ariz.....	1,400.06	49.25	1,449.31
New Orleans, La.....	63,935.80	36,283.30	100,219.10
Newport, R. I.....		35.00	35.00
New York (Rosebank), N. Y.....	176,886.29	39,384.59	215,770.88
Nogales, Ariz.....	4,882.16	112.37	4,994.53
Norfolk (Fort Monroe), Va.....	30,852.46	3,975.88	34,828.34
Pascagoula, Miss.....	1,200.00		1,200.00
Pensacola, Fla.....	9,014.86	879.60	9,894.46
Perth Amboy, N. J.....	1,980.00	600.00	2,580.00
Portland, Maine.....	14,601.85	1,980.30	16,582.15
Portland, Oreg.....	9,105.44	1,651.67	10,757.11
Port Townsend, Wash.....	15,133.87	4,638.43	19,772.30
Presidio, Tex.....	5,600.92	783.86	6,384.78
Providence, R. I.....		360.00	360.00
Rio Grande, Tex.....	2,005.00	93.26	2,098.26
Roma, Tex.....	4,325.00	619.87	4,944.87
Sabine, Tex.....	27,878.96	2,514.88	30,393.84
St. Andrews (Panama City), Fla.....	1,200.00	51.00	1,251.00
St. George Sound, Fla.....	300.00		300.00
St. Johns River (Jacksonville), Fla.....	8,258.84	2,097.52	10,356.36
San Diego (Point Loma), Calif.....	12,384.98	1,583.41	13,968.39
San Francisco, Calif.....	67,032.54	13,169.27	80,201.81
Savannah, Ga.....	7,714.30	903.15	8,617.45
Seattle, Wash.....	16,691.67	3,195.86	19,887.53
Tampa, Fla.....	20,201.00	4,237.67	24,438.67
Terminal Island (Los Angeles), Calif.....	42,248.47	9,391.37	51,639.84
Ysleta, Tex.....	1,190.00	4.60	1,194.60
Zapata, Tex.....	1,865.00	360.00	2,225.00
Freight and miscellaneous.....		39,493.32	39,493.32
Total.....	932,266.88	279,385.35	1,211,652.23
INSULAR QUARANTINE STATIONS			
Hawaii.....	36,134.66	7,910.12	44,044.78
Philippine Islands.....	21,905.54		21,905.54
Puerto Rico.....	37,655.86	9,997.78	47,653.64
Virgin Islands.....	15,749.48	2,974.75	18,724.23
Total.....	111,445.54	20,882.65	132,328.19
Grand total, all stations.....	1,043,712.42	300,268.00	1,343,980.42

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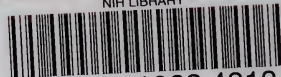
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